

TOLOGY DEPT

MODERN Machine Shop

October, 1946

Table of
Contents
Page 121

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OCT 15 1946

DETROIT ✓



America's
st complete line of

F-PROTECTED BEARINGS

IRMA-HOFFMANN™

CISION BALL, ROLLER AND THRUST BEARINGS

A-HOFFMANN BEARINGS CORPORATION

STAMFORD, CONNECTICUT

FIELD OFFICES: New York, Chicago,
Cleveland, Detroit, Pittsburgh, Phoenix,
Cincinnati, Los Angeles, San Francisco,
Portland, Ore., Seattle

SPECIFY

LOGAN

Sure-flow centrifugal pumps

...WHEN YOUR COOLANT SYSTEM REQUIRES

- 1 → **ABILITY TO SAFELY HANDLE LIQUIDS CONTAINING SUSPENDED ABRASIVE MATERIAL**—Open, unloading type impeller eliminates close clearances and metal-to-metal contact of running parts. Also assures rapid discharging of trapped vapor.
- 2 → **MINIMUM VIBRATION**—For grinding, honing, super-finishing and other precision operations. Integral motor drive eliminates need for gears, chains or other mechanical drive which might set up detrimental vibrations.
- 3 → **IMMEDIATE COOLANT FLOW WITHOUT PRIMING**—Self-priming pump models can be located above, below or remote from liquid supply. No auxiliary priming reservoirs, check valves or other accessory equipment required.
- 4 → **CONTINUOUS OPERATION**—Motors have ample capacity for continuous operation at maximum pump capacity. Totally enclosed to keep out splashing liquids, abrasive dust and other foreign matter.
- 5 → **UNUSUAL LATITUDE IN LOCATING PUMP**—As afforded by self-priming feature, integral motor drive and compact vertical construction.
- 6 → **SPECIAL PURPOSE PUMPS**—27 standard models include self-priming without submerging pumps, grinder and submerged types, and high speed models for driving stream, deep hole drilling and chip flushing applications. 5 standard mounting types.

Logan

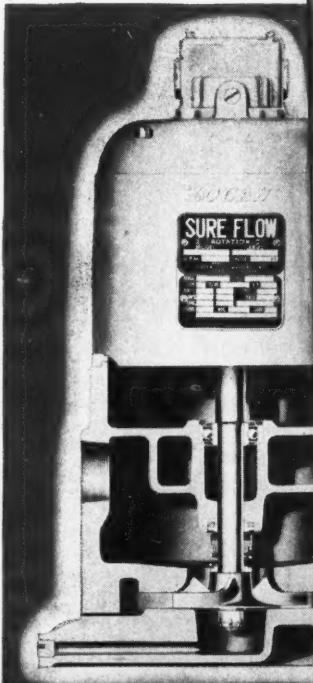
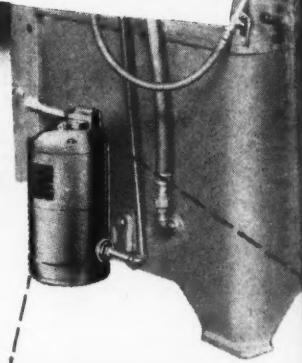
Air and Hydraulic Equipment

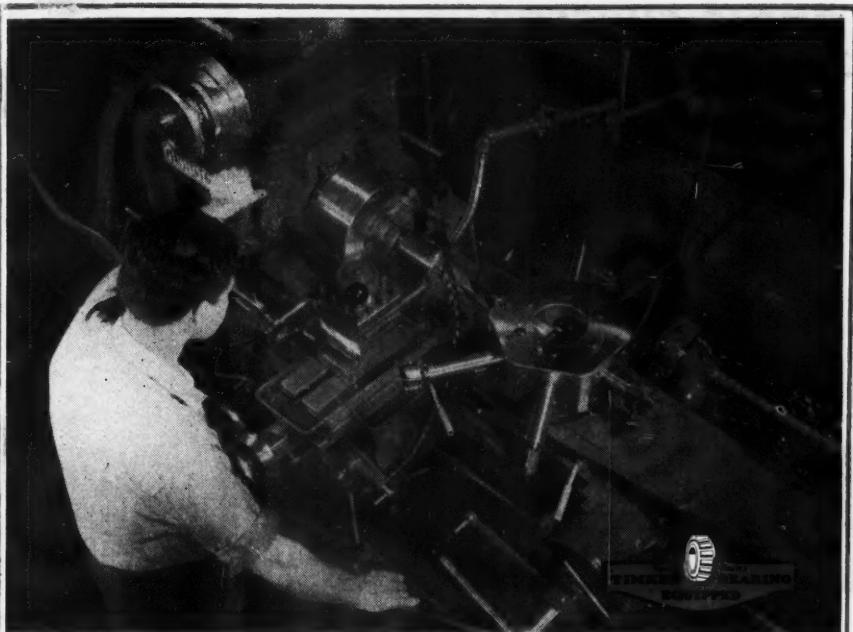
LOGANSPORT MACHINE CO., INC.



WRITE FOR
THIS FREE
CATALOG

GROOVES • CYLINDERS • VALVES • PRESSURES • SURE-FLOW COOLANT PUMPS





PHOTOGRAPH COURTESY GISHOLT MACHINE COMPANY, MADISON, WISCONSIN.



Magicians in Metal

Timken Bearing Equipped spindles work magic in modern machine tools and the operator at the controls is the magician. At his will they produce precision; increase production; prevent waste.

By their capacity to carry both radial and thrust loads and constantly maintain alignment, Timken Tapered Roller Bearings exercise complete and accurate control over the spindle under all speeds, feeds and cutting loads; save power; simplify lubrication.

There's no vibration, no chatter, no run-out; just smooth, steady rotation that's kind to tools and tempers.

Because Timkens are the world's best-known bearings, they make the world's best-selling machines. Look for the trade-mark "TIMKEN" on every bearing you use; none but the genuine have it. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

R. v. 19th Oct. 1946 - Jan. 1947
LANDIS CHASERS PERMIT "CLOSE-TO-SHOULDER"

THREADING THROUGHOUT ENTIRE LIFE

The Length of Chaser Throat remains permanent



12 Features of the LANDIS TANGENTIAL CHASER

- 1-Permanent throat permits close to shoulder threading throughout life of chasers
- 2-Rake angle range covers all machinable materials
- 3-Free cutting condition permits maximum cutting speeds
- 4-Simple grinding operation renews entire cutting edge and leading feature
- 5-Line contact with work lessens friction and minimizes thread distortion
- 6-Leading feature insures thread of accurate lead
- 7-Lateral absorption of cutting strain reduces vibration and chaser breakage
- 8-Right and lefthand threading feature reduces chaser equipment
- 9-Standard chasers thread all diameters with proper chaser holders
- 10-Interchangeability of chasers lowers operating cost
- 11-Chaser length provides exceptionally long life and low tool cost
- 12-Permanent throat gives equal distribution of cut

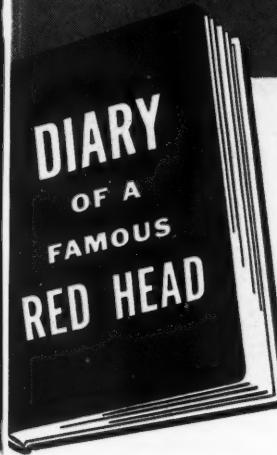
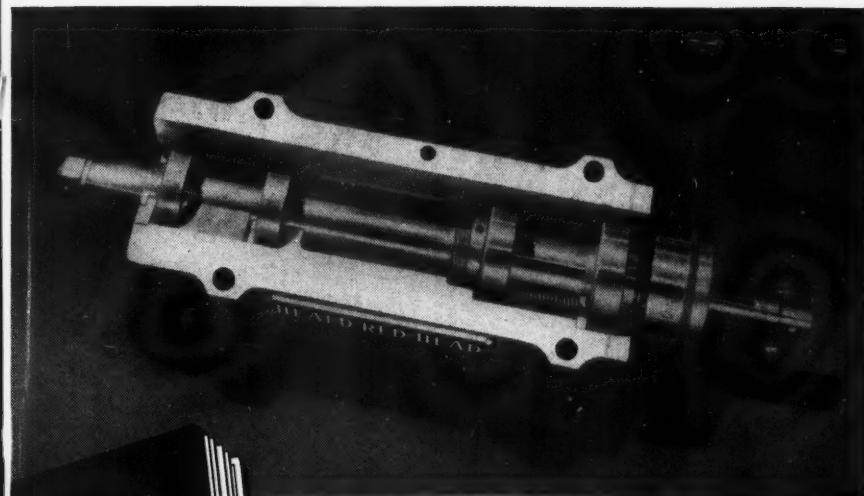
When regrinding the chasers, the entire cutting edge is renewed without increasing the length of the "bevel" or throat. The throat of Landis chasers is never reground. Thus, "close-to-shoulder" threading is permitted throughout the entire life of the chasers.

The cutting edge is always directly on cutting center regardless of the overall length of each individual chaser. The cutting position is not affected by regrinding.

The Finest Thread Cutting Tool in Industry.

LANDIS
MACHINE COMPANY
WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS



BORN

"Red Head" Boringheads and Wheelheads were conceived in the Heald engineering rooms, after many years of experiment by top specialists in machine tool design. The "Red Head" had to be self-adjusting . . . it had to be dependable and foolproof . . . and it had to deliver the very finest in precision finishing. Result: a rugged, serviceable head, soundly constructed and adaptable to every requirement in internal grinding and borizing operations.

VITAL STATISTICS

Cutaway view above illustrates some of the exclusive features of "Red Head" design. Spindle bearings are of the angular contact type, assembled under definite spring preloading which automatically compensates for temperature expansion or contraction and wear. Oil flow to the bearings is regulated by individual felt wicks. Close-fitting baffles exclude dirt and water.

SERVICE RECORDS

The Heald "Red Head" has earned a reputation for doing its job—whether it be high speed operation rotating grinding wheels or tools, or carrying heavy work fixtures—with a minimum of maintenance and with the utmost in precision efficiency. Here are some actual "Red Head" service records from our files:

- 22,000 hours' service—in production 24 hours a day.
- 6 years' production—no bearing replacements or repairs.
- 24-hours-a-day production for 3 years maintaining perfect condition.
- 8½ years' operation—36,420 hours' service.

- In continuous operation for 10 years—still using the original boringhead bearings.
- 32 Bore-Matics with over 100 Heads in one plant—only one required bearing change.
- 45 Bore-Matics in another plant—some in continuous operation for 8 years without boringhead trouble.

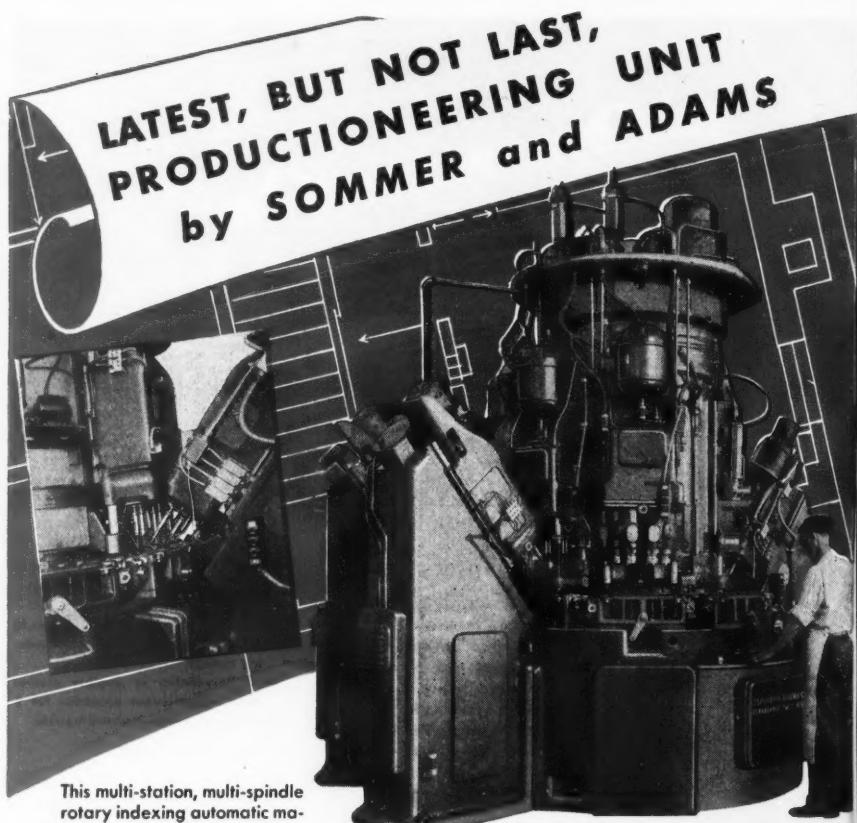
Records like these, common among "Red Head"-equipped Heald machines, result in quicker set-ups, fewer delays, less down time—factors that may well mean the difference between profit and loss in your machining work. Whatever the size of your shop or the scope of your work, chances are that the "Red Head" and the men who designed it can help to give you faster, more economical production. For further information, write: THE HEALD MACHINE COMPANY, Worcester 6, Mass.

HEALD

means more precision

. . . less cost

INTERNAL AND SURFACE GRINDING MACHINES • BORE-MATIC PRECISION FINISHING MACHINES



This multi-station, multi-spindle rotary indexing automatic machine is a typical example of Sommer and Adams Productioneering. It is designed to bore, ream, counterbore, chamfer, tap and face a number of holes in small motor blocks, pump parts or machine components.

On the machine itself, any sequence of operations up to eight stations can be set up, each operating head having its own electric motor and hydraulic system, electronically synchronized with the rest, and with the indexing mechanism. These heads operate vertically. Further operations at desired angles may be added at any or all of the stations, with separate column-mounted heads having the same type of independent mechanism, which can be synchronized to the machine cycle. (Inset shows close-up of vertical and angle operations at the same station.) . . . Your problem may be different—but if it can be solved mechanically, Sommer and Adams can build machines to do it.



THE SOMMER AND ADAMS COMPANY

18519 EUCLID AVENUE • CLEVELAND, OHIO

Custom-Built EQUIPMENT FOR MANY PURPOSES

SUBSIDIARY OF THE FEDERAL MACHINE AND WELDER COMPANY

PRECISION GEARS

FOR SMOOTH POWER FLOW IN MACHINE TOOLS

Farrel-Sykes continuous tooth, herringbone gears transmit power in a smooth, constant flow that protects accuracy in machine tool operation.

Precision generation of these gears by the famous Farrel-Sykes method, giving accuracy of tooth contour and tooth spacing . . . uniform distribution of the load on each tooth and across the entire face . . . balancing of axial thrusts by the opposed helices . . . are factors which assure efficient power transmission, quiet operation and long gear life.

They are known as the *Gear with a Backbone* because the two helices meet to form continuous teeth instead of being separated by a center groove. This *backbone* provides extra strength and high load-carrying capacity in small space.

Farrel-Sykes gears are available in any size up to 20 feet diameter for practically any industrial application. Complete information will be supplied promptly, on request.

FB-319

FARREL-BIRMINGHAM COMPANY, INC.

344 VULCAN ST., BUFFALO 7, N.Y.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N.Y.

Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte.

Farrel-Birmingham

YOUR *Thin* CIRCULAR
WORK NOW CAN BE...



GARDNER-GROUND

THIS new Gardner development opens up a new field for thin, parallel-surface work requiring close accuracies.

The spring-steel automobile clutch plate seen here, measures 10 $\frac{1}{8}$ " O.D. by 4 $\frac{1}{8}$ " I.D. by .055" thick — too thin to be fixtured by conventional Double Disc Grinding methods. The large area involved, necessitates rotating the plate mechanically, rather than relying upon the spinning action caused by the opposed grinding wheels, which was standard practice in the past.

This Gardner No. 120A-26" Double Grinder carries an hydraulically-operated work table, mounted on a stationary knee. Two driven groove-type rollers contact the O.D. of the clutch plate, while a small straight roller contacts the I.D.

under spring pressure, holding it into the driving rollers. Positive rotation and resulting close accuracy are assured.

PRODUCTION: 20 to 25 pieces per hour.

TOLERANCES: .002" for parallelism. .004" for uniformity.

STOCK REMOVAL: .020" maximum overall.

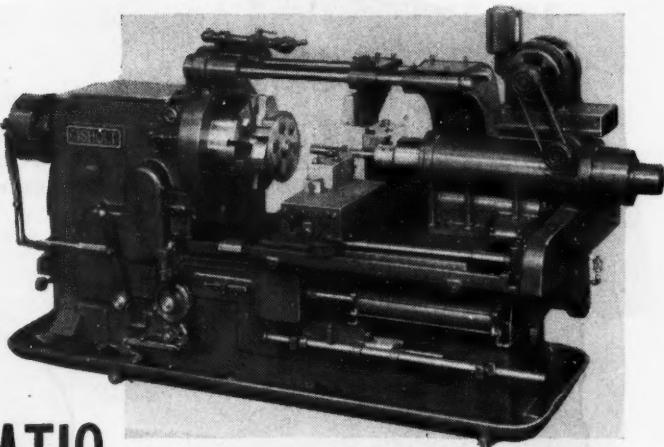
Use Modern
GARDNER
WIRE-LOKT
Abrasives
on YOUR
Disc Grinders

GARDNER - GRIND
YOUR Flat SURFACES

GARDNER MACHINE COMPANY

428 East Gardner Street • • • Beloit, Wisconsin, U.S.A.

This standard platen type Simplimatic, specially toolled for machining rear axle drive gear hubs, in combination with standard tool slides, is equipped with motor-driven quill for rotating the boring bar. Part is completely machined with 7 rough and finish cuts in 2½ minutes, floor to floor.



THE GISHOLT

SIMPLIMATIC makes it SIMPLE—and FAST!

• Here's another example of the adaptability of the Gisholt Simplimatic—a standard machine which gives you all the advantages of an automatic lathe individualized for the specific job.

This is made possible by the large horizontal platen table which permits a greater number of independent tool slides, each favorably cammed for its own particular cut, and providing an ideal condition for each tool as to cutting speed

and feed, order of engagement, dwell and retract.

Rugged, fast, and accurate, the Simplimatic pays dividends in any shop, small or large, seeking maximum production at minimum cost. Ask for complete information.

GISHOLT MACHINE COMPANY
1219 East Washington Avenue • Madison 3, Wisconsin

Look Ahead... Keep Ahead...
with Gisholt



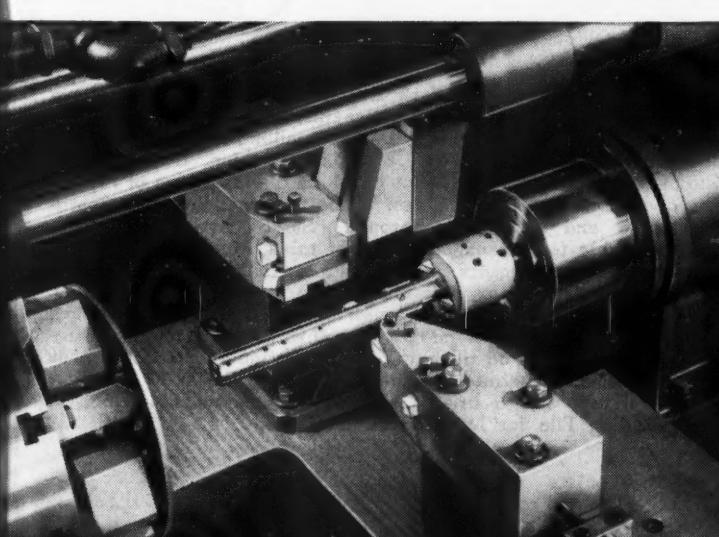
TURRET LATHES

AUTOMATIC LATHES

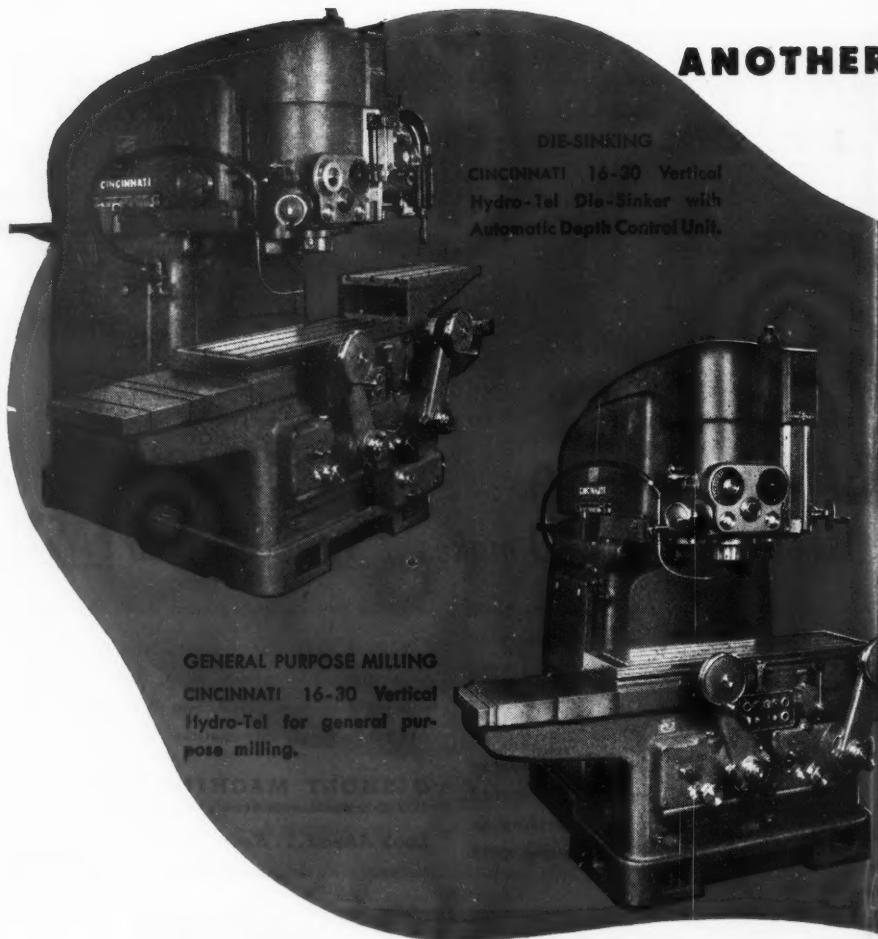
SUPERFINISHERS

BALANCERS

SPECIAL MACHINES



ANOTHER AD



DIE-SINKING

CINCINNATI 16-30 Vertical
Hydro-Tel Die-Sinker with
Automatic Depth Control Unit.

GENERAL PURPOSE MILLING

CINCINNATI 16-30 Vertical
Hydro-Tel for general pur-
pose milling.

● The CINCINNATI 16" series Vertical Hydro-Tel Milling Machine, a recent addition to Cincinnati's complete line of milling machines, is built in three styles: 1) general purpose milling machine; 2) die-sinking machine; 3) automatic 360° profiling machine. It offers many features which effect production economies on a wide range of vertical milling operations. To mention a few of the features: finger-tip operation of table and cross slide through "Servo" hydraulic control; infinitely variable feed rates; fixed height table; centralized controls; sixteen spindle speeds; quick change adapter for spindle nose; automatically lubricated ways, and others that are equally important. ¶ It will pay you to investigate the new CINCINNATI 16" series Vertical Hydro-Tels for your vertical milling, die-sinking and profiling operations. Complete details on all features and engineering specifications on all three machines are contained in catalog M-1497. Write for your copy today! For a brief description of this machine, look in Sweet's Catalog File for Mechanical Industries.

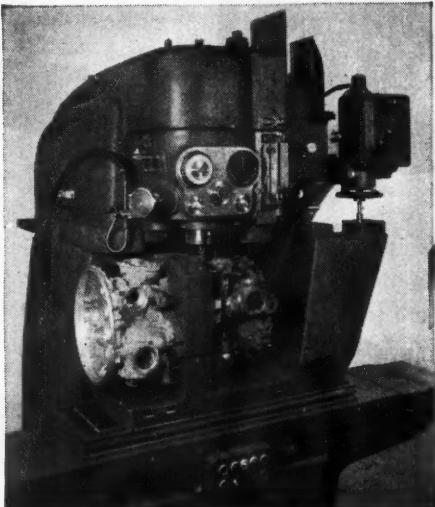
**ANOTHER ADDITION TO CINCINNATI'S LINE OF
MILLING MACHINES**

The 16" Vertical Hydro-Tel

IN 3 STYLES

PROFILING

CINCINNATI 16-30 Vertical Hydro-Tel with 360° profiling equipment tooled up for milling a complex profile.



THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

LING MACHINES

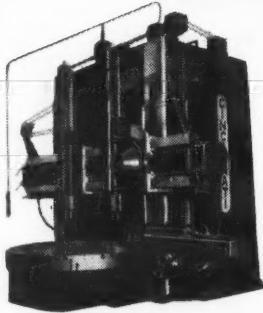
• BROACHING MACHINES • CUTTER SHARPENING MACHINES

CINCINNATI

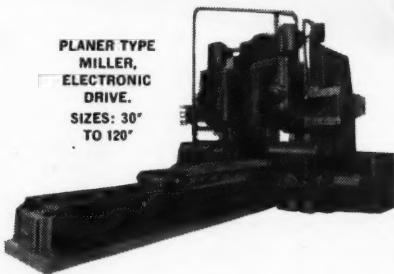
HYPRO

MACHINES

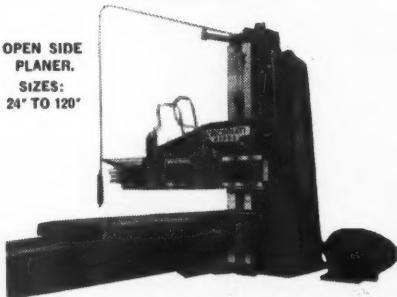
VERTICAL
BORING
MILL.
SIZES:
54" TO 12"



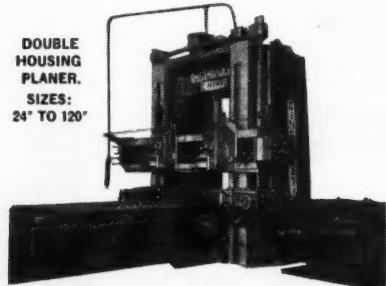
PLANNER TYPE
MILLER,
ELECTRONIC
DRIVE.
SIZES: 30"
TO 120"



OPEN SIDE
PLANER.
SIZES:
24" TO 120"



DOUBLE
HOUSING
PLANER.
SIZES:
24" TO 120"



HYPRO IS SHORT FOR HY-PRODUCTION AND A SHORT CUT TO HIGH EFFICIENCY

THE CINCINNATI HYPRO PLANER COMPANY

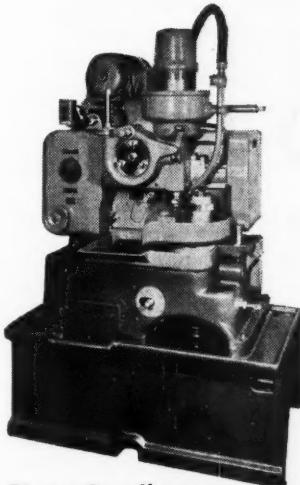
PLANERS • BORING MILLS • PLANNER TYPE MILLERS

CINCINNATI, OHIO

Never an Idle Moment

... for the Versatile GEAR SHAPER

Your Gear Shaper never asks for "time off" in the shop, because it can be used for such a large variety of work. Often a simple cutter change will start it humming on many unusual parts such as cams, splines, and irregular shapes. For complicated contours, the addition of special fixtures and fixtures may be necessary—yet all this is accomplished without impairing the high-accuracy production possibilities of the Gear Shaper.



7A-type Gear Shaper

Fellows

THE FELLOWS GEAR SHAPER CO., Springfield, Vermont
616 Fisher Bldg., Detroit 2, or 1040 West Town Office Bldg., Chicago 12

EVERY ONE...

THE PORTABLE DRILL

...TOOL OF A

THOUSAND USES

"IF IT'S A JACOBS, IT HOLDS"

Jacobs

*WITH ALL LEADING PORTABLE DRILL MANUFACTURERS
IN AMERICA, THE STANDARD IS*

Jacobs Chucks

This overwhelming preference throughout an industry is substantial proof of the practical design, consistently accurate performance and complete reliability of Jacobs Chucks. Backing the aim to make these the world's best chucks are such qualities as . . .

Nickel alloy steels for strength and toughness - Areas subject to wear carefully surface hardened - Lands are heat treated for extreme hardness but with adequate core strength retained - Grip sleeves are simultaneously ground internally on three dimensions for balance - Tools can be readily changed and are always accurately centered with a sure grip - Minute tolerances permit ready interchangeability.

In your shop - or in your product - make Jacobs Chucks your first choice because "if it's a Jacobs, it holds!"



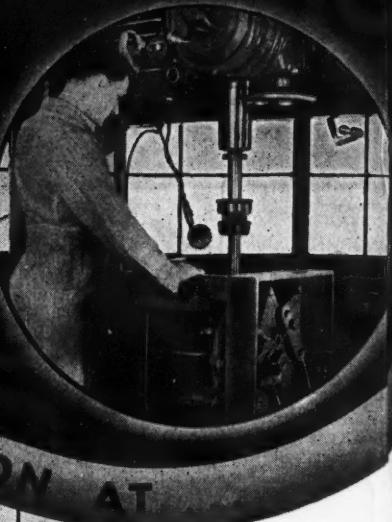
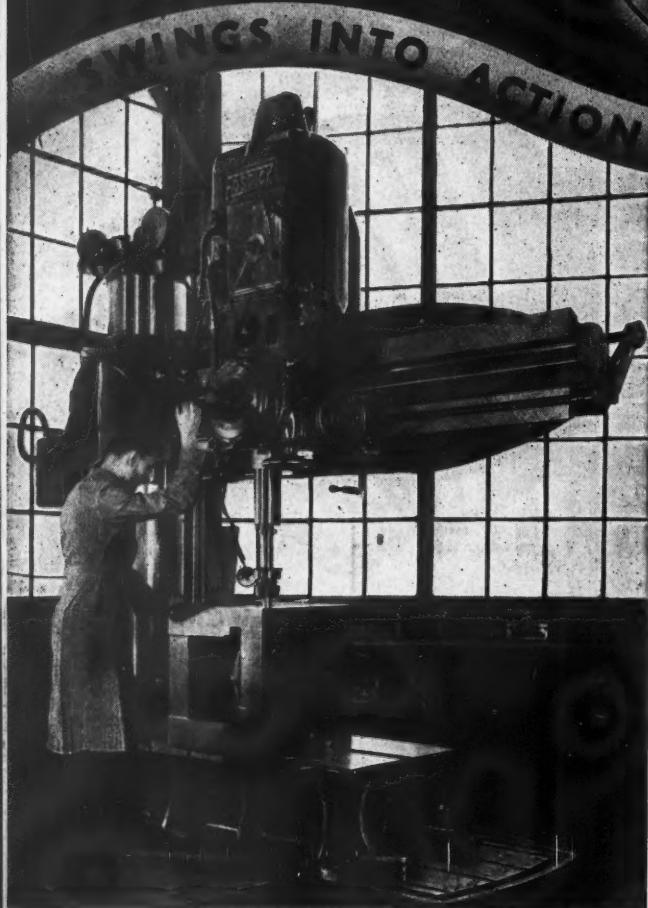
Jacobs Plain Bearing Key Chuck

*Electric and air driven

Chucks

THE JACOBS MANUFACTURING COMPANY
Hartford, Connecticut

FOSDICK RADIAL



SWINGS INTO ACTION AT

EX-CELL-O CORPORATION

The part being drilled is only one of many parts of various Ex-Cell-O machines that are drilled, tapped or bored on the sturdy, time and labor saving FOSDICK RADIAL DRILL.

A box jig holds the work while drilling, reaming or tapping various diameter holes from two or more sides.

Note the convenience and time-saving features of centralized control in the head. A wide range of feed and speed changes, as well as hand feed, are instantly available.

If your work can be handled on a Radial, it can be done on a Fosdick. Write for Bulletin MSR for full particulars.

FOSDICK

MACHINE TOOL CO.
CINCINNATI 23, OHIO

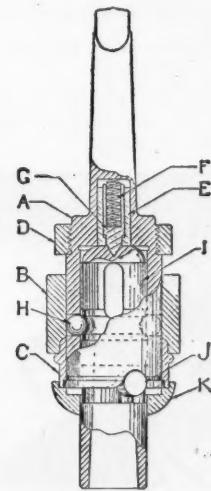
Jarvis POWER TOOLS

Quick Change Chucks and Collets

EXTRME accuracy, tremendous torque capacity and absolute safety are the outstanding features of the Jarvis Quick-Change Chucks and Collets.

In their manufacture exceptional care is taken in the selection of the steel for chuck as well as collet; both are hardened and ground inside and out.

Write for our
Latest Catalog MFTI



THE CHARLES L. JARVIS CO., MIDDLETOWN, CONN.

TAPPING ATTACHMENTS • FLEXIBLE SHAFT MACHINES • GROUND ROTARY FILES



**you wouldn't
hunt elephants with
a 'BB' gun . . .**

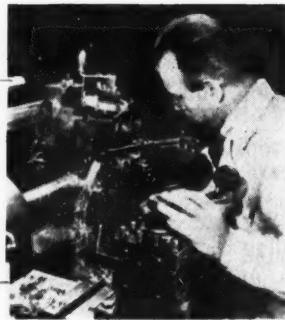
Nor would you put carbide cutting tools on a lathe that cannot transmit the power to use them at their maximum efficiency. Carbide cutting tools have increased horsepower requirements as much as 300 per cent. They have increased cutting speeds 200 to 500 per cent.

The chances are that turning accounts for 25 per cent or more of all machining time in your plant.

There are cases in our files of savings of hundreds of dollars a month in the manufacture of a single part by the use of Jones & Lamson machines. Our Turret Lathes and Fay Automatic Lathes are designed specifically for the most efficient use of carbide tools.

Be skeptical of the production efficiency of all metal turning equipment in your plant.

Telephone or write for a Jones & Lamson engineer who will be glad to consult with you on all phases of your metal turning problems.



What HORSEPOWER Are You Using?

15 horsepower is required to take this 1/8" depth of cut on steel forging at 1000 RPM and .022" feed, with a carbide cutting tool, but carbide halves the cutting time.

Engineered to "Carry the Load" for Most Productive Operation With Carbide Cutting Tools



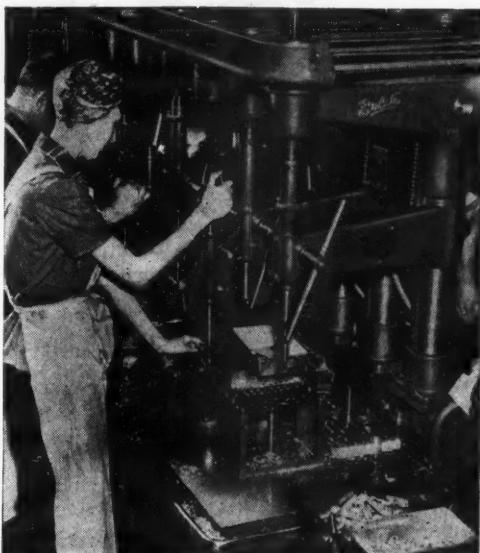
JONES & LAMSON

MACHINE COMPANY
Springfield, Vermont, U.S.A.

Turret Lathes

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers • Ground Thread Flat Rolling Dies.

LOWER COST PER HOLE with this "Buffalo" Line-up



Multiple spindles lined up for multiple operations on one table without changing the setup...that's how the "Buffalo" No. 22 Drills at left give you more turn-out at lower cost!

And the drilling, tapping, reaming, boring and counter-boring you do has greater accuracy. "Buffalo" Drills are rigidly built with all precision - machined, precision-fitted parts. Controls are easily operated, and when you do need a different setup, it's readily made.

There's a wide range of "Buffalo" drills to meet every drilling problem you

may have . . . bench and floor models, single and multi-spindle, production and tool room drills. The full line is described in **Catalog 37**. Write for it . . . for lower drilling costs!

BUFFALO FORGE COMPANY

388 BROADWAY

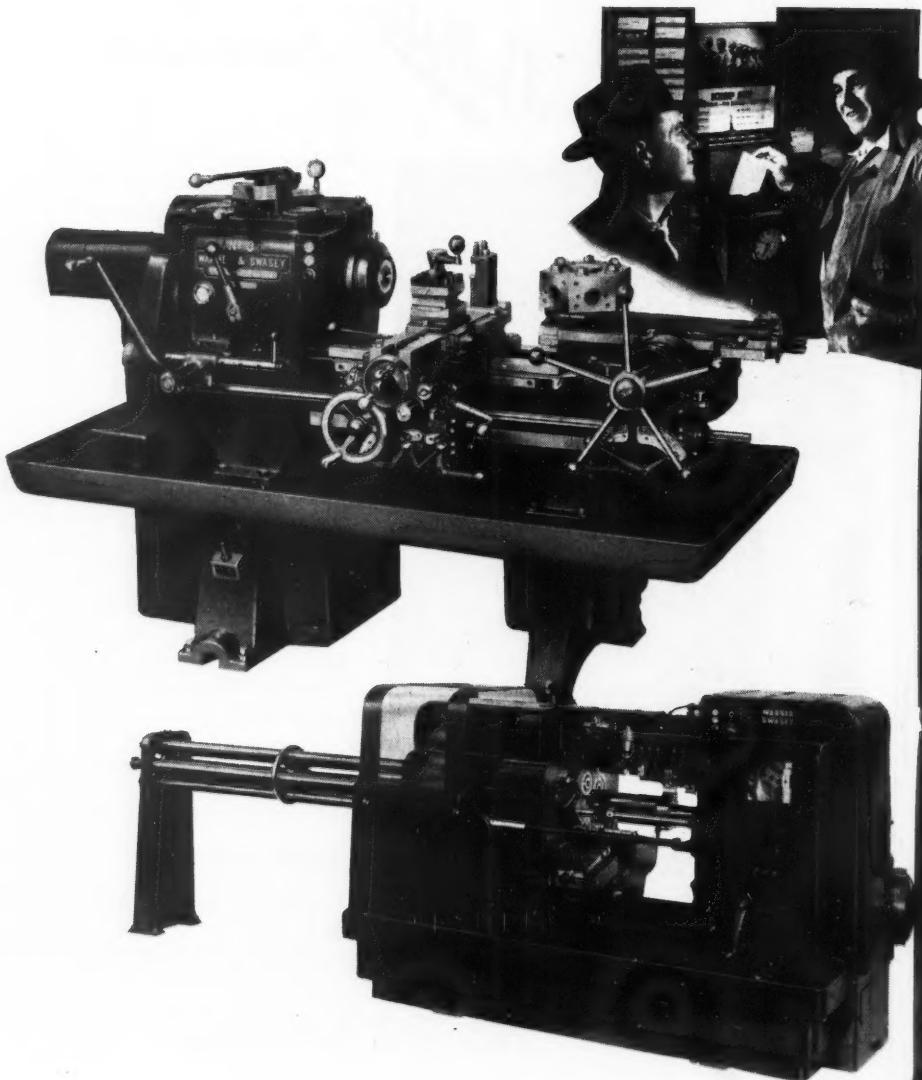
BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

No. 22 DRILLS

Give your operators the *Chance*



YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH A WARNER & SWASEY PRECISION MACHINE

to be more productive!

EVERYONE SEEMS AGREED THAT THE WAY TO KEEP DOWN
RISING PRICES AND PREVENT HARMFUL INFLATION IS
TO INCREASE PRODUCTION WITHOUT INCREASING PRODUCTION COSTS

IN THE METAL TURNING INDUSTRY, that puts it squarely up to the men running the machines. But can they be expected to work at a faster, harder pace—or work longer hours?

The logical solution is to provide them with newer, up-to-date machine tools that enable them to deliver more precision-finished pieces at the end of a normal working day without expending greater manual effort.

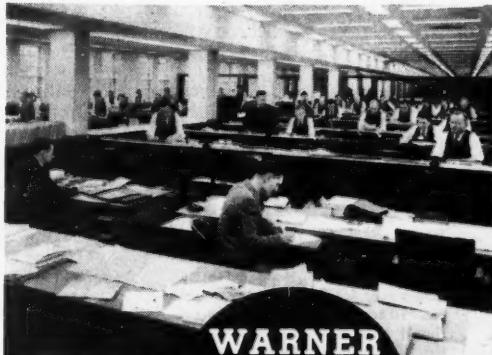
Over half of all machine tools in service in private industry are 10 years old, or older. We estimate that 54% of Warner & Swasey Turret Lathes in service in private industry are 10 years old, or older.

In many instances, replacement with new Warner & Swaseys will prove extremely profitable. In others, productivity can be greatly stepped up by installing time-saving and labor-saving devices such as power chuck wrenches, collet chuck boosters, open-type square turrets, etc.

Special tooling arrangements also offer ways to increase production.

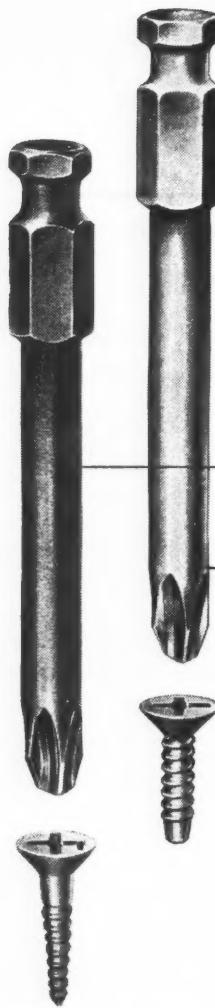
We maintain a large engineering department devoted specifically to solving production problems through specially devised tooling.

It will pay you to investigate the possibilities of increasing production in your shop, either through new Warner & Swaseys, or by improved accessories and tooling arrangements for your present machines.



**WARNER
&
SWASEY**
Machine Tools
Cleveland

MACHINES



*Drive more screws
per bit!*

BLACK FINISH for standard (soft) screws

SATIN FINISH for self-tapping screws

Only Apex offers you a complete line of screwdriver bits in two ranges of hardness. And for good reason. It has been proved repeatedly that Apex regular bits give you maximum service on soft screws—and that Apex extra-hard bits do the best job on self-tapping screws.

It's easy to tell which is which—easy to stock separately—easy to select the right bit for

the particular job. And it's easy to order the right Apex bit for your job. Use the regular Apex part number for the regular (*black*) bits; add an "X" to the Apex part number to order the extra-hard (*satin finish*) bits. (This applies to all bits in the Apex line: for Phillips, Clutch Head, and Slotted Head Screws.)

Specify Apex and save.

Write today for the
Apex catalogs you need.

- No. 15: Bits and Hand Drivers (one-piece) for Phillips screws.
- No. 102: Bits and Hand Drivers (insert type) for Phillips screws.
- No. 16: Bits for slotted screws.
- No. 17: Bits and Hand Drivers for clutch head screws.

The Apex Machine & Tool Co., 1028 S. Patterson Blvd., Dayton 2, Ohio

APEX

screwdriver bits

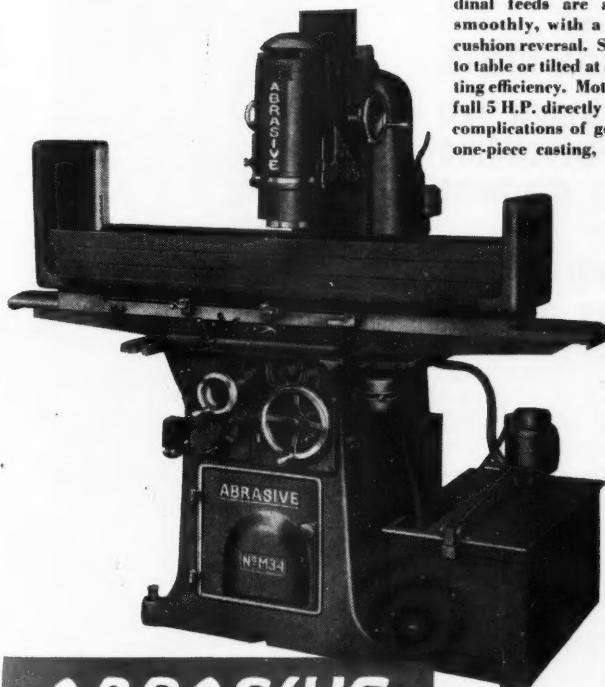
Safety Friction Tapping Chucks; Quick Change and Positive Drive Drill Chucks; Vertical Float Tapping Chucks; Parallel Floating Tool Holders; Power Bits for Phillips, Slotted Head and Clutch Head Screws; Hand Drivers for Phillips and Clutch Head Screws; Aircraft and Industrial Universal Joints; Sockets and Universal Joint Socket Wrenches.

ABRASIVE M-34

VERTICAL SPINDLE GRINDER



The M-34 gets big production grinding dies, spacers, parallels, and other flat work. Its vertical spindle design includes every feature for accuracy, maximum output, and long life. Vertical and longitudinal feeds are automatic — table reciprocates smoothly, with a hydraulic shock absorber to cushion reversal. Spindle may be set perpendicular to table or tilted at a slight angle for maximum cutting efficiency. Motorized precision spindle delivers full 5 H.P. directly at the cutting point, without the complications of gearing or belting. The massive one-piece casting, weighing 1540 lbs., is heavily ribbed to minimize vibration and insure perfect alignment throughout life of the machine. A wet grinding attachment is standard equipment on the M-34 — magnetic chucks and rotary grinding attachments are available.



ABRASIVE

ACCURACY BOOSTS PRODUCTION

SPECIFICATIONS

WORK CAPACITY:

24" long
8" wide
12" high

SPINDLE:

Built-in 5 hp motor,
3450 R.P.M.
ball and roller bearing.

WHEEL SIZE:

Segment type,
6" diam.

TABLE SIZE OVERALL:

59" x 10½"

NET WEIGHT:

3000 lbs.

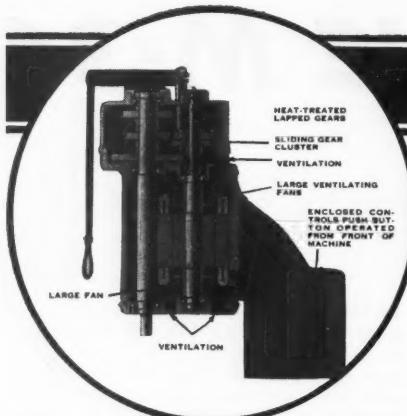
Write for Bulletin



Write us for information on
ABRASIVE Machines on the Government
Machine Tool Surplus List . . .
just send the machine serial number.
We will endeavor to supply attach-
ments, accessories, and repair parts
as required.

ABRASIVE MACHINE TOOL CO., East Providence 14, Rhode Island

Avey FEATURE No. 2



**THE *Avey* TYPE MA-6
AVEY-MATIC POWER FED
HAND FEED AND REVERSING
MOTOR TAPPING MACHINE**

features
**motor and gear box
construction of
six speed machine**

Motor mounted directly back of spindle with gearing between motor and spindle drive sleeve. Two speed motor, three speed transmission. Only one pair of gears in mesh at any spindle speed. Motor and spindle drive mounted on ball bearings, fan ventilated motor.

Type MA-6 is made in following capacities:

- No. 2 — $\frac{7}{8}$ " capacity in cast iron.
- No. 3 — $1\frac{1}{4}$ " capacity in cast iron.

**THE AVEY DRILLING MACHINE CO.
CINCINNATI • OHIO • U. S. A.**

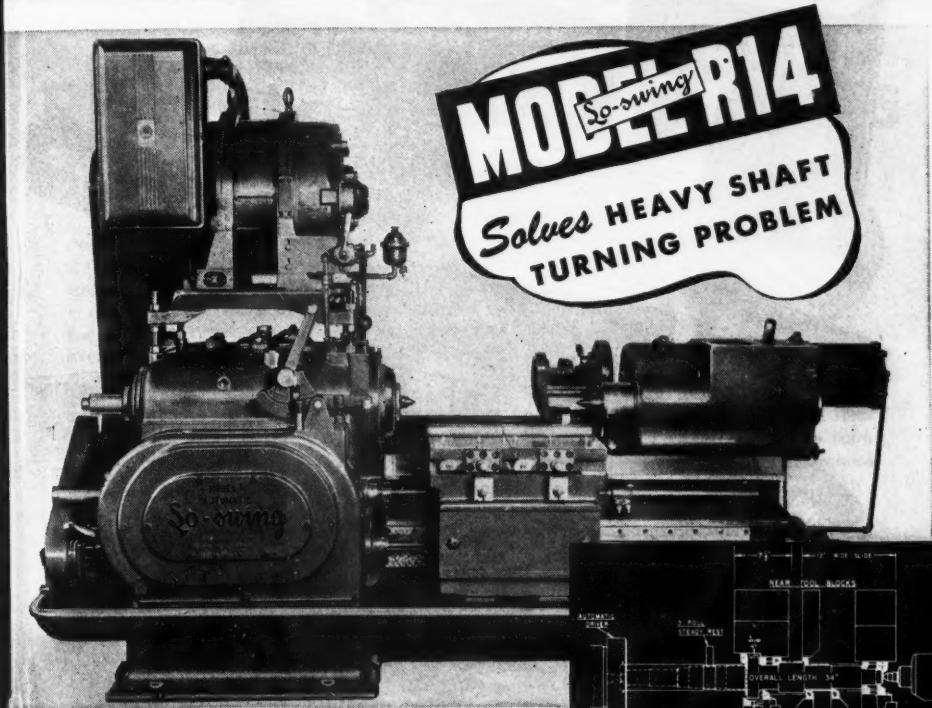


THREE SPINDLE No. 2
TYPE MA-6 • COMBINATION MACHINE

- 1st Spindle - Avey-matic Feed
- 2nd Spindle - Hand Feed
- 3rd Spindle - Tapping (Reversing Motor)

MACHINE OF THE MONTH

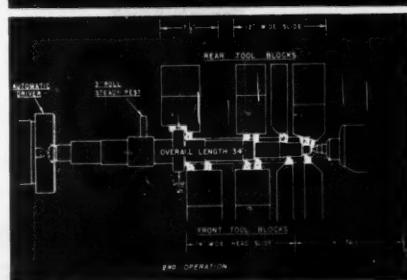
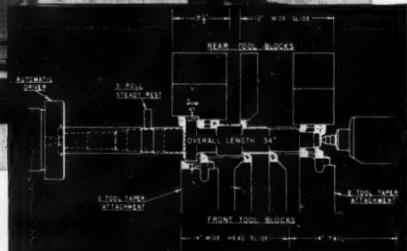
REARED BY THE SENECA FALLS MACHINE CO. "THE So-swing PEOPLE" SENECA FALLS, NEW YORK



Problem: To provide a single Automatic Lathe capable of turning, facing and undercutting a variety of heavy forged shafts and reducing minimum time for change-over from job to job.

Solution: The Model R-14 Automatic Lo-swing Lathe was chosen for this job, primarily because it had the power and capacity necessary to handle heavy shafts from 3" to approximately 8" diameter. A built-in, Quick Change-over Mechanism on this Lathe also provided a simple and speedy means for varying the carriage stroke, required for each individual shaft.

Heavy forged shafts come to the Lathe centered on both ends and fitted for the three roll steady rest (first operation only). One end of the shaft is first turned and faced, then reversed (second operation) and the other end turned and faced as shown in the line drawings. The shaft is driven with a Standard Seneca Falls Automatic Gear Driver which prevents slippage of the piece, thus taking full advantage of cemented carbide tools with high cutting speeds and large feeds.



SENECA FALLS MACHINE CO., SENECA FALLS, N.Y.

6 ATHE NEWS from SENECA FALLS

Banish "Speed Limits" PRODUCTION



AT THE
Metal Congress Show
Atlantic City • November 18-22
Exhibit No. F-125 Main Floor
See Federal Automatic Welders
team with Warco Presses
and other interesting
demonstrations.

THIS BOOK ANALYZING BASIC
TYPES OF FEDERAL AUTOMATIC
WELDERS AND THEIR APPLICA-
TION IS YOURS ON REQUEST

THE *Federal* MACHINE

SUBSIDIARIES

Sommer and Adams Co., Cleveland—SPECIAL HIGH PRECISION MACHINES
The Warren City Mfg. Co., Warren—WARCO PRESSES and PRESS BRAKES

From The Road to use Federal Resistance Welders

Many of the limitations imposed on production speed in the metal working industries are avoidable.

The fact is that material shortages and unit-man-hour problems beyond our control make it more imperative than ever to do away with limitations that are more or less self-imposed. Specifically, failure to employ methods of maximum efficiency.

Automatic welding has made possible more short cuts in time and cost in metal goods manufacture than any one method or "tool" we know. Wherever metal to metal fastening on a production basis is a problem, there's a strong chance of resistance welders of one type or another providing the most efficient answer. Federal makes every type and size of resistance welder, many specially designed for highly special needs.

Motive behind the great National Metal Congress show at Atlantic City is to provide a refresher course on the most modern and efficient methods for speeding production. Federal will be there with a big demonstration pertinent to this point. (Exhibit F 125, Main Floor) . . . A wonderful chance for you to get authoritative advice on methods banishing speed limitations.

Meantime there's a Federal representative in every key city ready to give you such advice immediately. There's also bulletin SP 346 (illustrated herewith) which describes the vast variety of basic types of Federal Resistance Welders and their application. Get your copy now!



FLASH WELDERS



FEDERAL MONEY BUREAU
FEDERAL BUREAU OF INVESTIGATION
U. S. DEPARTMENT OF JUSTICE



SPECIAL AUTOMATIC WELDERS



AND WELDER COMPANY



218 DANA ST., WARREN, OHIO

No "waiting" cost here!

There are no costly delays, no men and machines standing idle, waiting for stock to be cut off from bars, when the stockroom is equipped with a No. 6A or 9A MARVEL High Speed Sawing Machine.

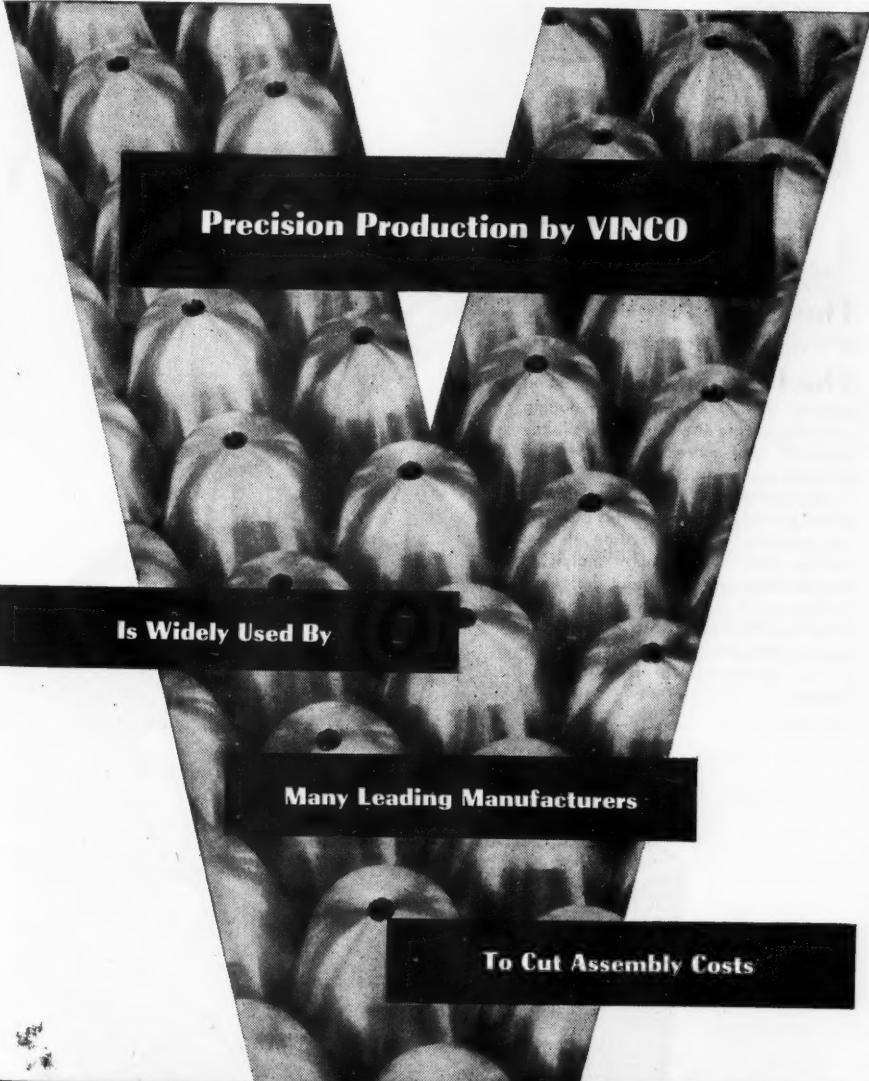
These fast, all-ball-bearing high speed saws will cut off accurate lengths or slices at almost unbelievable speed. Equipped with an automatic bar push up, they will cut identical pieces from single or nested bars automatically, with no more operator attention than an automatic screw machine. Still, at any point, the automatic operation can be interrupted, a miscellaneous cut made, and the "production" run resumed by simply re-engaging the bar feed. A single MARVEL Automatic can keep well ahead of a large machine shop, increasing the earning time on all machines.

There is a MARVEL Saw for every need—in every capacity range and price class. Your local MARVEL Sawing Engineer will gladly study your metal sawing problems and requirements and make recommendations as to methods and equipment.

Send for Catalog.

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave. **Chicago 39, U.S.A.**
 Eastern Sales Office: 225 Lafayette St., New York 12, N. Y.

MARVEL Saws



Precision Production by VINCO

Is Widely Used By

Many Leading Manufacturers

To Cut Assembly Costs

MILLIONTHS OF AN INCH FOR SALE BY VINCO

VINCO CORPORATION, 8881 SCHAEFER HIGHWAY, DETROIT 27, MICHIGAN; SALES OFFICES, NEW YORK, CHICAGO, CLEVELAND.

REG. U. S. PAT. OFF.
Semi-Automatic Hydraulic Spline and Gear Grinder • Optical Master Inspection Dividing Head • Involute Checker • Angle Tangent
to Radius Dresser • Index Plates • Precision Vises • Sine Bars • Straight side Spline, Serration Spline, Involute Spline and Helical
Spline Plug and Ring Gages • Thread Plugs, Rings and Setting Plug Gages • Spur and Helical Master Gears • Muntzian Gages •
Propeller Shaft and Hub Gages • Built-up and Special Gages • Gear Rolling Inspection Fixtures • Indexing Fixtures • Hydraulic
Power Control, Utilization and Distribution Units • Engineering, Design and Development • Precision Production Parts.

They Came To

The Shop . . .

All tolerances held to $\pm .0001$

The Fixture . . . Designed and built by VINCO to control the slotting operation on the above part. It is plainly apparent that extreme accuracy and painstaking construction of the fixture is mandatory if the specified tolerances of the part are to be held. This is a typical example of all precision fixtures built by VINCO. A thorough analysis of the job requirements, careful designing, skillful grinding, lapping and finishing of all essential parts to a gage exactness is VINCO'S established procedure in the construction of precision built fixtures.



VINCO

To

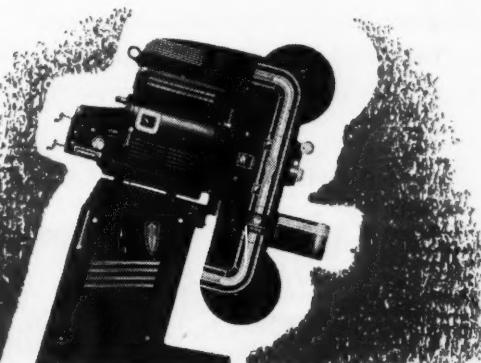
With a tough production job. Toil and sweat had convinced the Brenkert Light Projection Company, a subsidiary of Radio Corporation of America, that the star part, shown on the opposite page, would require an overall accuracy to within .0001" if it were to function at its planned efficiency. Twenty-four times each second this part must start and stop and, between each pause, attain a speed of 3485 R.P.M. Such performance called for accuracy to the Nth degree and Brenkert knew they needed the "tops" in gages and fixtures to attain and hold such close limits so;

They Came to Vinco

Our successful completion of this and many other assignments for Brenkert Light Projection Co., is a matter of record. The surest way to gain and maintain precision production of any part or parts is to first ascertain and then supply the needed equipment to make this production possible. Selecting and producing this equipment requires highly specialized engineering knowledge and mechanical skill. A proven, reliable source for this specialized service is VINCO. Over twenty-five years of widely varied experience in close tolerance work is our guarantee for this statement.

The Product . . .

The Brenkert "80" Motion Picture Projector—the successful result of ceaseless research, superlative engineering and skilled craftsmanship. Hidden away in this projector is the star we have been talking about. It is the vital element of a finely co-ordinated mechanism known as the intermittent. It is the action of this intermittent which produces the illusion of motion that you see on the screen. The vastly improved action of the Brenkert Intermittent has reduced annoying picture unsteadiness to its lowest point. Increased light efficiency to the greatest degree yet attained.



This is *HIGH SPEED*

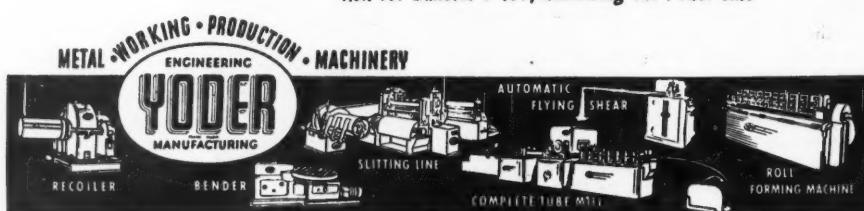
YODER Slitting Line in Action Delivering Many Miles per Day of Widely Varied Stock and Special Sizes from $\frac{3}{8}$ " up.

When it comes to production slitting of steel for industry you can't beat a combination like this complete Yoder Slitting Line and a smooth working team of operators, at the modern plant of Follansbee Steel Company (Follansbee, West Virginia). If you could see the strips of high-grade stainless whistling from the slitter to the double swivel recoiler, and watch the every-motion-counts way these lads swivel and unload one set of recoils while threading the next set, you would understand what we mean.

Per-pound costs figure out right with this sort of production, and stepped up output helps industry get the steel urgently needed for the manufacturing of goods that will keep us all employed.

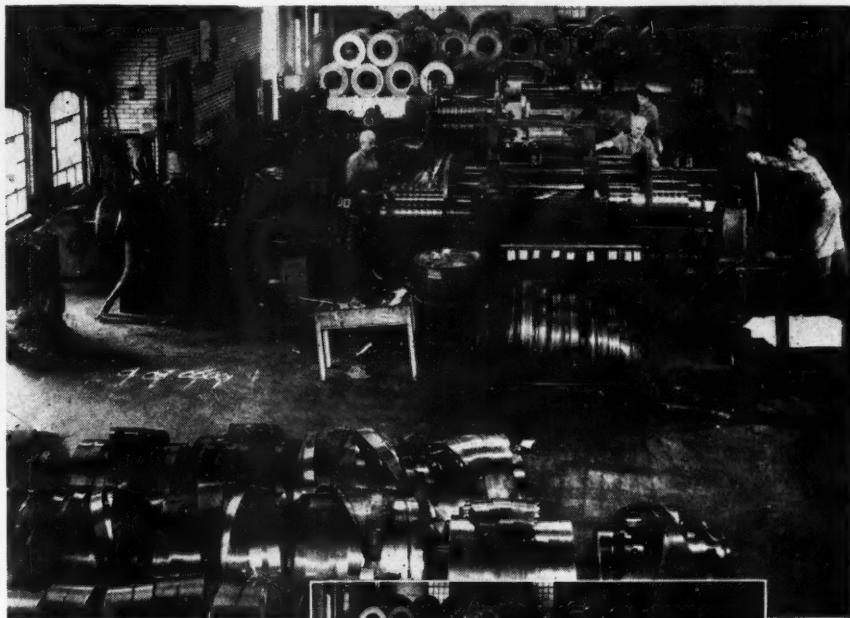
Yoder makes a great variety of other special metal working machinery too . . . all designed with the same objective—to cut costs by raising production.

Ask for Bulletin G 451, describing the Yoder Line



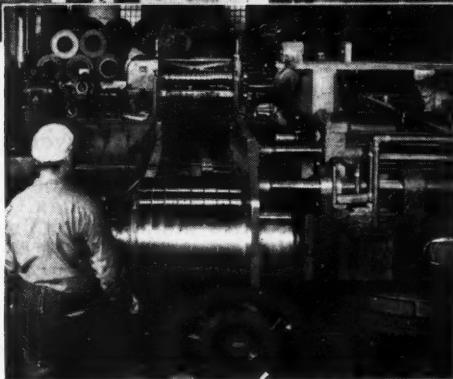
With accurately sized spacers, shims and cutters, change of setup on the Yoder slitter is simple and fast. Note that the substantial job being set up here leaves plenty more capacity on the slitter.

Metal Slitting at its Best



Overall view of the Follansbee Yoder Installation. A real production layout. Note unloading of eight recoils while eight more are recoiling on the same machine. Coils in background are mill stock; those in foreground finished slit stock.

Straight and uniformly accurate strip is cleanly cut with a minimum of waste on the Yoder slitter, this set of coils is just about to be cut free and unloaded. In less than half a minute strip will be rolling again on the other reel of the double swivel recoiler.



THE YODER COMPANY

5532 WALWORTH AVE., CLEVELAND 2, OHIO





MANHATTAN

Abrasive Wheels

Designed by competent engineers to give you the lowest cost per pound on metal removed or number of pieces ground where Rubber Bond or Resin Bond is adaptable to the job. Complete range of sizes for swing frames, floor stands and portable grinders operating at high speed. For weld grinding topped by work on stainless. Low speed semi-polishing wheels to prepare the weld for final blend polish. And do not forget Manhattan for centerless grinding.

Also: Manhattan Diamond Wheels and Polishing Wheels

Write Abrasive Wheel Department

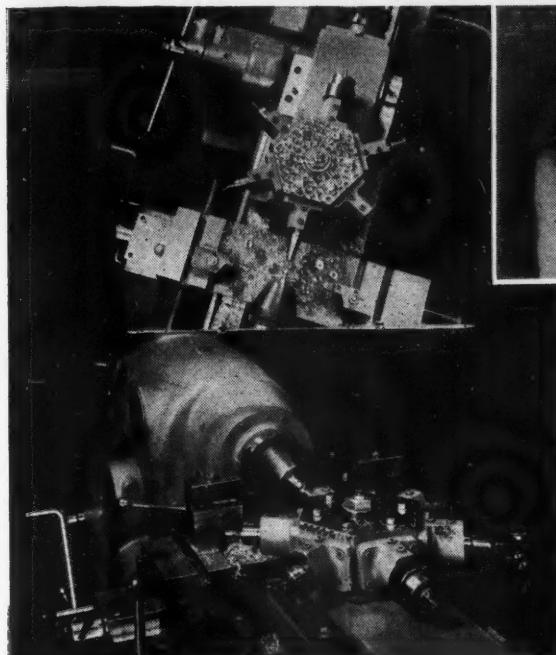
RAYBESTOS-MANHATTAN, INC.



MANHATTAN RUBBER DIVISION
EXECUTIVE OFFICES AND FACTORIES

PASSAIC, NEW JERSEY

36.6 SECONDS FROM BAR TO FINISHED PART



Part—Knurled Clamp Nut
Material—Brass, $\frac{5}{8}$ " Bar Stock

Preselected Spindle Speeds—5

Time Per Piece—36.6 Seconds

Setup Time—43 Minutes

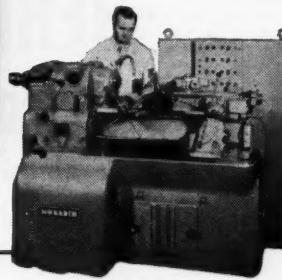
Here's another outstanding case of Speedi-Matic savings on repetitive manufacturing—knurled nuts rolling out at the rate of almost 100 an hour!

Each nut requires six speed changes per cycle. Time: 36.6 seconds! Small wonder that users everywhere are calling the Speedi-Matic "the world's fastest hand screw machine!"

The Monarch Mirror shows the reflection of this efficient production setup: 7 operations, using 5 positions on the hexagon turret, plus the front and rear cut-off slides. The tooling is typical of the class of job on which you can save time and money with a Speedi-Matic. It combines maximum production with extreme accuracy on lots of 25 to 500 or more. Get the full facts now, while deliveries are still favorable.

THE MONARCH MACHINE TOOL CO.

Sidney, Ohio



FOR PEAK PRODUCTION AT A PROFIT SPECIFY SPEEDI-MATIC

Here's what you get:

- Automatic electronic speed change, preselected for as many as ten stations.
- Complete range of spindle speeds—50 to 5000 rpm.
- Feeds from .0005" to .016" per revolution.
- Power feed ram-type turret.
- Spring-return hand-operated cut-off slide.
- Air-fed pusher-type collet attachment.
- Collet chuck capacity— $\frac{7}{8}$ ".

Photograph courtesy Black & Decker Mfg. Co.



HERE *you need an* ARMOURCLAD FIBRE COMBINATION DISC!

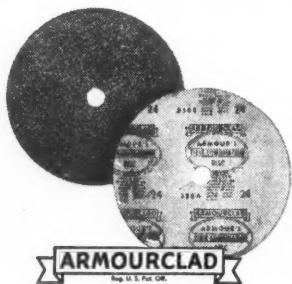
Armour Abrasives Help You Do Your Jobs Better

For better, faster finishing you'll need the fastest tools and the best abrasives possible.

In any operation . . . in cutting welds . . . in removing burrs . . . in leveling metal surfaces . . . there are

specialized ARMOUR ABRASIVES designed to do a better job at less cost. The faster, sharper, cooler-cutting Armourclad Fibre Combination Disc is only one of Armour's complete line of better metal-working abrasives.

It will pay you to call on Armour's experienced technicians. They will gladly help you choose the abrasives and methods which do your jobs best.



ARMOUR Sandpaper WORKS

DIVISION OF ARMOUR AND COMPANY
1355 West 31st Street • Chicago 9, Illinois



THE STUDER PROFILE GRINDER

The Studer principle employs a tracer finger which follows the form of a template and transmits its movements to the grinding wheel through a pantograph. The wheel and stylus can be swiveled. Because the wheel is shaped beforehand proportionately to the exact shape of the tracer finger an object can be ground over its entire length in one operation—with one wheel. Because a fixed template is used, errors due to incorrect manipulation are eliminated. A special template holder permits the grinding of circular forms or contours like cams over their entire circumference.

Now you can perform intricate profile grinding at practical high speeds and to exceptional degrees of accuracy! With the Studer Profile Grinding Machine Type PSM you can attain accuracy within $\pm 0.0002"$ in producing profile gages, straight or circular form tools, sectional dies, complete contours like cams, templates and similar parts of hardened steel. Profiles up to 5.9" in length can be ground from end to end in one continuous operation without moving work-piece or template. Circular work up to 4" in diameter can be ground, and flat pieces—several of which can be stacked for grinding at one time—can be handled up to 2" in thickness. Small sized profiles can be accurately produced without preliminary grinding to form, and clearance angles on parts such as form tools can be ground without removing the work from its original setting.

These are the highlight features of the Studer Profile Grinder. If you can use its exceptional accuracy, its speed and ease of operation, its amazing versatility, write for complete information.

We also represent in the United States these other makers of Swiss High Precision Equipment: Societe Genevoise d'Instruments de Physique (SIP), Andre Bechler, Maag Gear Wheel Co., Mikron, Safag, Salizz, Schaublin, Lienhard, Billeter. Our engineers will be glad to work with you in specifying and using equipment for the highest precision machining.

HIGH PRECISION MACHINE TOOLS

C O S A
CORPORATION



AND MEASURING INSTRUMENTS

CHRYSLER BUILDING
New York 17, New York

Industry's FINEST PRECISION METAL CUTTING MACHINES



IMMEDIATE DELIVERY

These Famous Maquoketa Construction Features assure LONG LIFE — TROUBLE FREE SERVICE — COMPLETE CUTTING ACCURACY — LOW COST OPERATION:

- Four Cutting Speeds—65, 93, 120, 149 strokes per minute.

- Self-aligning blades give absolute cutting accuracy.
- Stock is fed automatically to full capacity of machine.
- Machines swivel on base up to 45° permitting angular cutting without moving stock.
- Gears are in constant mesh, reducing amount of backlash to minimum.
- Positive compensating feed cuts more metal in less time.
- Exact duplication of pieces is assured by scale and spacer bar measuring.
- Transmission housed in oil tight case.

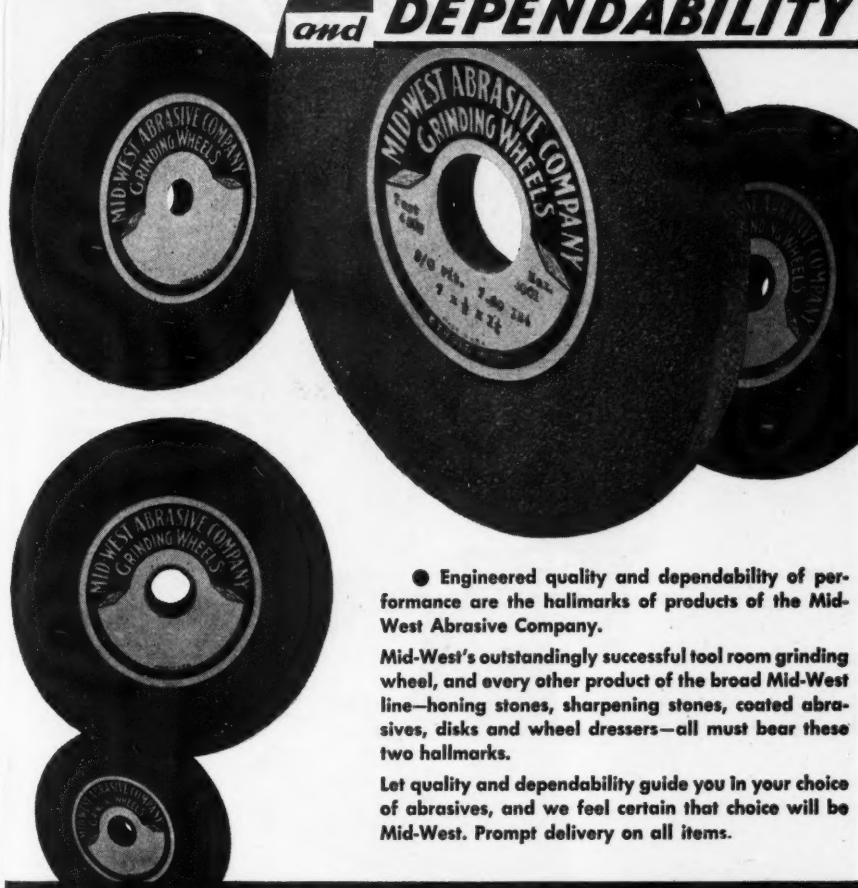
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Write today for literature,
prices, and detailed
specifications.

**MAQUOKETA
COMPANY**
Maquoketa, Iowa

QUALITY

and **DEPENDABILITY**



● Engineered quality and dependability of performance are the hallmarks of products of the Mid-West Abrasive Company.

Mid-West's outstandingly successful tool room grinding wheel, and every other product of the broad Mid-West line—honing stones, sharpening stones, coated abrasives, disks and wheel dressers—all must bear these two hallmarks.

Let quality and dependability guide you in your choice of abrasives, and we feel certain that choice will be Mid-West. Prompt delivery on all items.

M I D - W E S T A B R A S I V E C O .

Manufacturers of **DEPENDABLE** Abrasives

Owosso, Mich.

Detroit

Rochester, Pa.

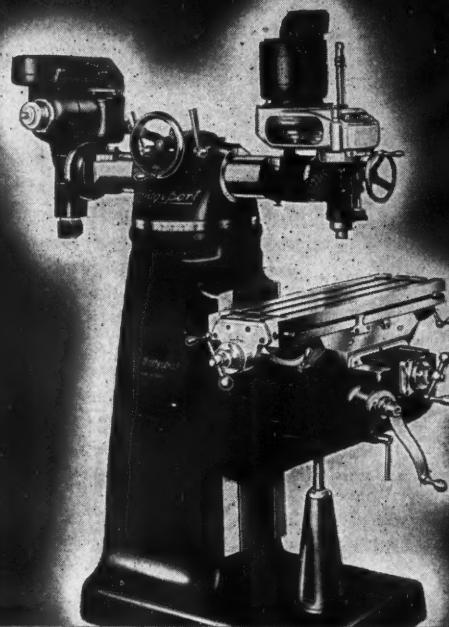


Bridgeport

TURRET MILLING MACHINE

THE BRIDGEPORT TURRET MILLING MACHINE has won universal acceptance. It has proved a most valuable time and labor saver in the tool rooms and production departments of the largest plants. Its wide range and versatility in milling, drilling, boring and shaping enable it to serve as the complete control machine around which all operations revolve in many small shops.

It will pay you to explore the possibilities of the "BRIDGEPORT" in your plant.



BRIDGEPORT MACHINES, INC.

52 RIVIER ST.

BRIDGEPORT, CONN.

New... Complete... 64 PAGES OF FACTS AND FIGURES

MODERN CATALOG-GUIDE
TO BETTER HOLE FINISH
with CARBOLOY-TIPPED
CEMENTED CARBIDES
Circular Cutting Tools

YOURS FREE

FOR THE COUPON



Here's to your increased efficiency—and economy—in the use of Carboloy-tipped Circular Cutting Tools. Your copy of the Staples new 64-page Catalog Guide is ready. It is a valuable storehouse of facts offered with the best wishes of Staples master craftsmen.

Profuse with illustrations and diagrams, the book is from a shop where Rockwell 58 to 62 is the hardness specification on bodies of hardened tools. For guidance to better hole finishing and lower tool costs, accept the new Staples Catalog Guide. Send the coupon.

THE STAPLES TOOL COMPANY
Formerly Staples Tool & Engineering Company
CINCINNATI 25 . . . OHIO

Staples CARBOLOY-TIPPED CIRCULAR CUTTING TOOLS

REAMERS • CORE DRILLS • SPOT FACERS • COUNTERBORES • END MILLS •
SHELL END MILLS • ALSO A COMPLETE LINE OF CIRCULAR SPECIAL TOOLS

The Staples Tool Company, Department C, Cincinnati 25, Ohio: Send your new Catalog Guide and Shop Manual on Reamer Usage without charge, to:

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ADDRESS _____

TITLE _____

CITY _____

ZONE STATE _____

THIS BOOK CONTAINS

Prices and Specifications

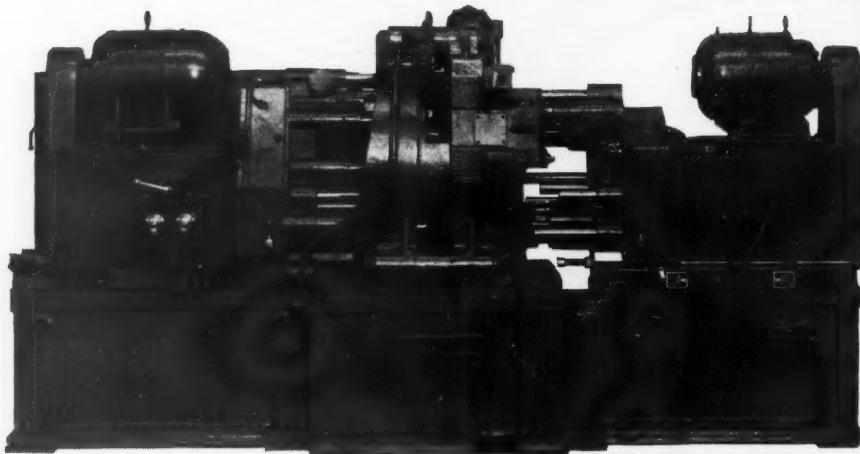
on Staples Reamers, Core Drills, Spotfacers, Counterbores and End Mills.

Technical Information

Special tool designing requirements; reamer usage; sharpenings; special instructions on reconditioning Staples Expansion Reamers; standard keyways and tapers; decimal equivalents and tap drill sizes.

Flexibility with **BAKER**
Self-Contained
Hydraulic-Feed

DRILLING - UNITS



• The Baker 7 1/2 AA14 machine shown here is multiple-drilling, reaming and spot-facing a cast iron transmission case cover.

These units are extremely flexible and are easily adjusted for feed lengths and feeding rates. They can be adopted for new multiple spindle heads if retooled. Fully automatic in cycle.

Vickers variable delivery pump re-

quires minimum horsepower for actual drive to pump allowing for 70% to 80% of horsepower of main drive motor for power for drive rotation of tools.

**Write for illustrated
data folder.**

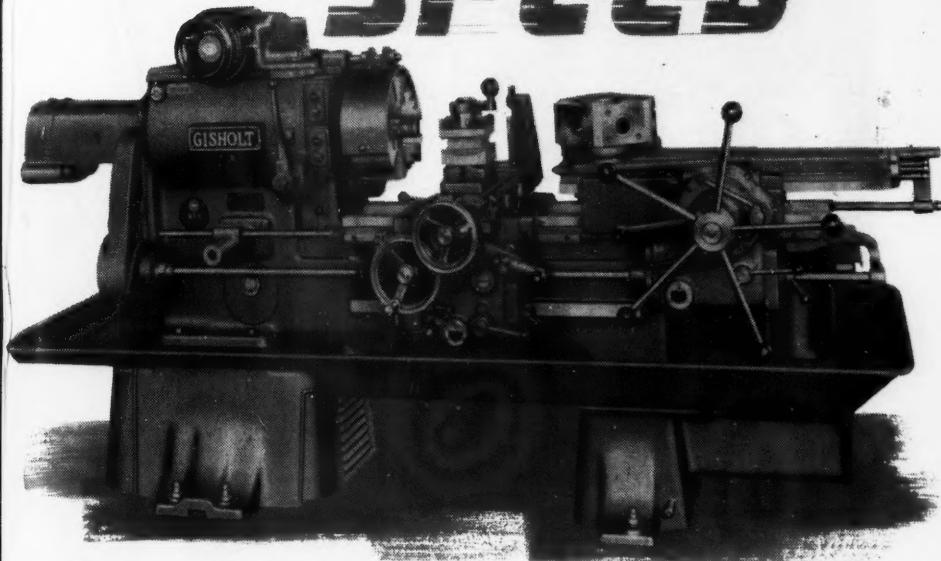


BAKER *Brothers, Inc.*

Drilling, Boring, and Tapping Machines

TOLEDO, OHIO

SPEED



with an easy change of pace to cut machining costs

Turret Lathe operation reaches a new high in efficiency in these newest Gisholt Ram Type machines. Whether it's starting, stopping, or reversing the spindle—or shifting gears for any of 12 spindle speeds—it's quick and effortless. It means less time lag between cuts—faster production—lower costs.

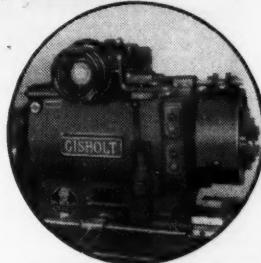
And because so little physical strength is required, the fatigue factor is reduced to a minimum. Output is more nearly constant throughout the day.

Speed and lower costs will be more important than ever in the days ahead. Now is a good time to get all the facts.

GISHOLT MACHINE COMPANY

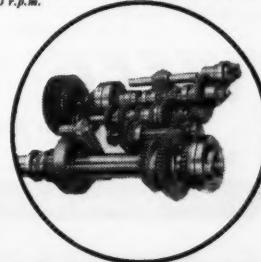
1219 East Washington Avenue • Madison 3, Wisconsin

Look Ahead . . . Keep Ahead . . . with Gisholt

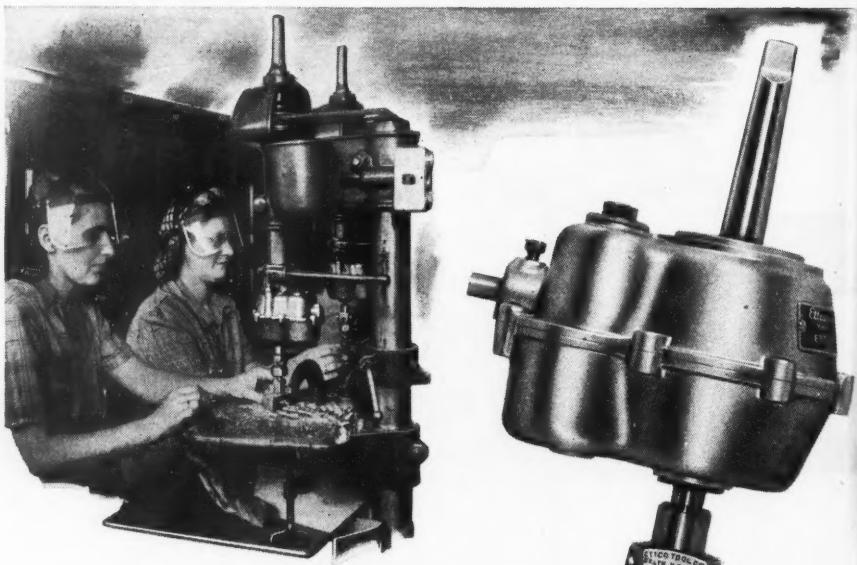


THE GISHOLT SPEED SELECTOR enables you to indicate the sequence of spindle speeds to be used and then obtain the ideal speed for each cut when you want it, by merely touching a finger trip. Hydraulic power shifts the gears instantly.

12 spindle speeds ranging from 28 to 730 r.p.m. are instantly available in the Gisholt No. 4 Ram Type Turret Lathe shown above. For high speed work, spindle speeds may be increased to 1460 r.p.m.



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



YOU GET MORE THAN JUST TOP-NOTCH ACCURACY WITH

Ettco-Emrick
TAPPING
ATTACHMENTS

Not only do you get clean and accurate threads with Ettco-Emrick Tapping Attachments, but you also get these three big "plus" features:

1. SENSITIVITY — The patented Ettco-Emrick friction clutch has the sensitivity of a hair trigger. This gives your work full protection from spoilage and also prevents tap breakage.

2. EASY OPERATION — All the necessary tapping skill is built into Ettco-Emrick Attachments by special design features. That's why ordinary unskilled operators—men or women—can turn out fast accurate tapping with them.

3. ECONOMY — Ettco-Emrick Tapping Attachments not only save labor and materials, but they give you these savings at a very low first cost—because they work right on your presses like any other shank tool.

It's these "plus" factors that have made Ettco-Emrick Tapping Attachments favorites for so many years in shops throughout the country. They're a profitable investment for any shop.

For full details, **WRITE FOR BULLETIN No. 2.**



**7 SIZES FOR
No. 0 to 1" TAPS**

ETTCO TOOL CO.

598 Johnson Ave., Brooklyn 6, N. Y.

Detroit 1

*

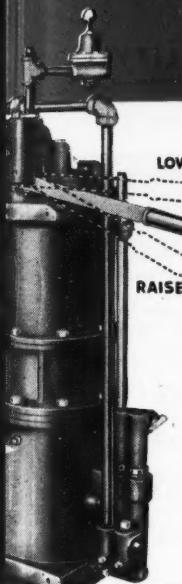
Chicago 6

Over 25 years specialization in solving industrial drilling and tapping problems

Now...Modernize

YOUR KRW ARBOR PRESSES

... FOR HIGH PRODUCTION WITH EITHER
AIR-OIL OR MOTOR-DRIVEN POWER UNITS



RAISE

LOWER

- Thousands of standard KRW Hydraulic Arbor Presses can now be power equipped for production use by adding the new KRW Power Units. These units . . . either air-oil or motor-driven . . . are available for 25, 50, 60 and 75-ton KRW standard presses. When power equipped, and utilizing simple, inexpensive dies, these standard presses are adaptable to a great many bending, forming, stamping and straightening operations . . . relieving heavier and more expensive equipment for other work. Either type power unit is easily attached to the press. Adding the unit in no wise affects the famous KRW two-speed hand pumping feature . . . press can still be hand-operated. Study the specification table shown here in terms of your work-pressure and motor needs. Give us the serial number of your KRW press and electric current requirements and we will quote you price and quick-delivery date. Put your idle or infrequently used KRW hand-operated Arbor Presses to work where they will pay big dividends . . . on your production line.

**THIS IS THE NEW KRW
AIR-OIL DRIVE THAT FITS
STANDARD KRW
HAND OPERATED PRESSES**

**THIS IS THE NEW
KRW MOTOR-DRIVE
THAT FITS
KRW HAND OPERATED
PRESSES**

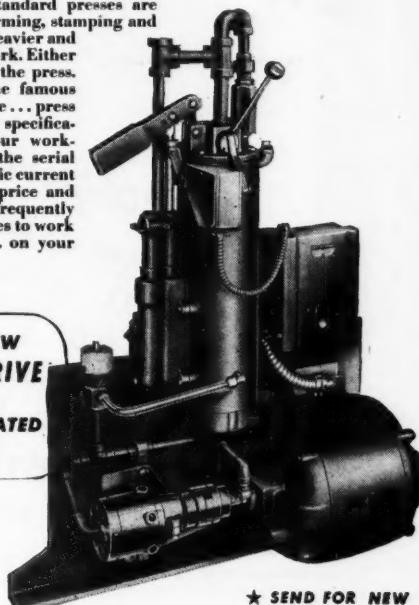
**AVAILABLE TONNAGE PRESSURES
25 - 50 - 60 TON PRESSES**

| AIR PRESSURE | 7" AIR CYLINDER | 9" AIR CYLINDER | 7" AIR CYLINDER | 9" AIR CYLINDER |
|----------------------|--|---|--|---|
| 100 TO 200 POUNDS | 2" Oil Cylinder 10 to 22 Tons | 1½" Oil Cylinder 14 to 29 Tons | 2" Oil Cylinder 17 to 35 Tons | 1½" Oil Cylinder 23 to 47 Tons |

75 TON PRESS

| AIR PRESSURE | 9" AIR CYLINDER |
|----------------------|----------------------------------|
| 100 TO 200 POUNDS | 2" Oil Cylinder 25 to 51 Tons |

**KRW Motor Drive develops up to Full Capacity
of any KRW Hand-Operated Press.**



**★ SEND FOR NEW
CATALOG . . . IT WILL
SAVE YOU MONEY!**

K. R. WILSON, 215 Main St., Buffalo 3, N. Y.

Please send me complete information on

KRW Air-Oil Power Units

KRW Motor-Drive Power Units

Serial number of our KRW Press is _____

Voltage _____ Cycle _____ Phase _____

Firm _____

Address _____

City and Zone _____ State _____

K. R. WILSON
15 MAIN ST. BUFFALO 3 N. Y.

Brightboy

Rubber WORKS WITH Abrasive
to-CUT OPERATION STEPS
REDUCE 'REJECTS'
IMPROVE SURFACE FINISH AND QUALITY

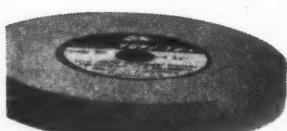
As soon as you see Brightboy at work



BRIGHTBOY STANDARD—Favorite for burring, finishing and polishing on the widest variety of metals and metal parts.

BRIGHTBOY FINE-TEX — Smoother, finer texture for work on softer metals, producing special finishes and for applications where the coarser wheel might not be suitable.

You'll recognize:
An unprecedented type of abrasive finishing.
BURRING - FINISHING - POLISHING
You'll appreciate the simultaneous
action of rubber and abrasive.
You'll think of many work-saving
Brightboy applications in the
manufacture of metal, wood and
plastic products.



BRIGHTBOY TUFF-TEX—Tougher texture, for finishing hard metals. The tougher binder accents the abrasive action, yet retains the soft rubber cushion, finishing and pre-polishing in one operation.

Ask your dealer for Brightboy methods and applications data, prices and catalog. Ask to have a Brightboy service representative call for specific-procedure recommendations.

BRIGHTBOY INDUSTRIAL DIVISION,
Weldon Roberts Rubber Co.,
Newark 7, N. J.

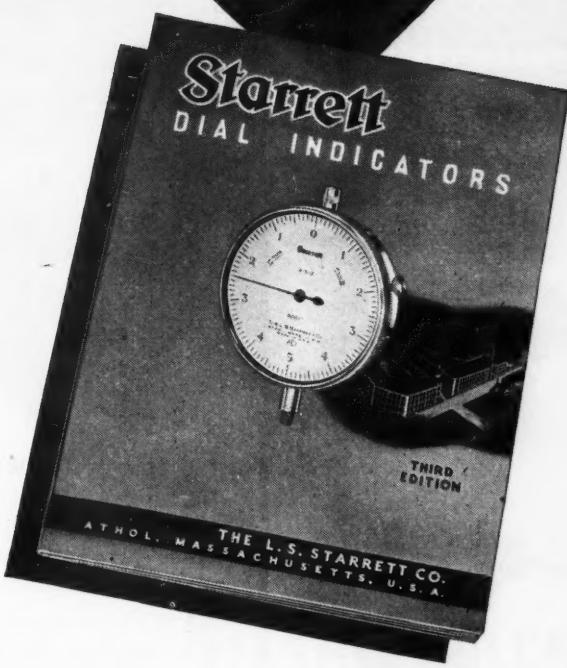


for

"One operation" bridging of production steps between the grind and the buff.
Removing: Tool & Weld Marks, Digs, Coatings and Paint.
For all phases of close-tolerance finishing by hand or machine.

STARRETT DIAL INDICATORS

IT'S RIGHT HERE



THE STARRETT DIAL INDICATOR FOR ANY APPLICATION... IN THE TYPE, SIZE, RANGE AND STYLE OF GRADUATION TO SUIT YOUR NEEDS EXACTLY...COMPLETELY DESCRIBED AND ILLUSTRATED ACTUAL SIZE... IN THE NEW EDITION OF STARRETT DIAL INDICATOR CATALOG MD. Write for your copy.

Buy Starrett Dial Indicator Gages thru your regular tool distributor.

THE L. S. STARRETT CO., - ATHOL, - MASSACHUSETTS, - U. S. A.
World's Greatest Toolmakers

STARRETT

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • HACKSAWS
METAL AND WOOD CUTTING BAND SAWS • GROUND FLAT STOCK

FINE-
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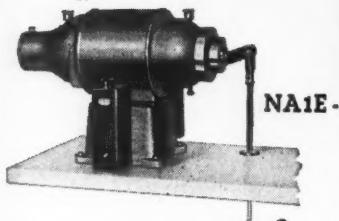
, 1946

IDEAL SPEED LATHES

For accurate, uniform,
speedy finishing of
metal & plastic parts.



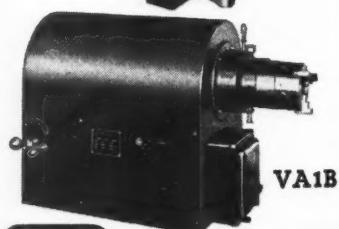
AWARDED
October '42



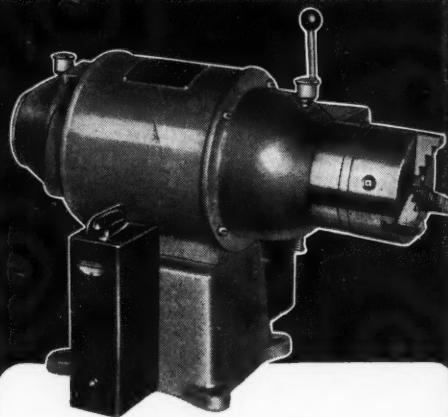
NA1E -



NA1C



VA1B



POLISH • LAP • DÉ-BURR • FINISH

NA1B (above) - for general finishing of gears, pulleys, dies, and other large pieces - metal or plastic.

NA1E - foot-operated collet type, for high-production finishing of many identical small parts.

NA1C - with hand- or foot-operated collet, to take up to 1" round stock.

VA1B - variable speed lathes, in bench and pedestal models, chuck and collet types.

*If you have a finishing problem
WRITE FOR CATALOG 440*

SCHAUER MACHINE COMPANY

ORIGINATORS OF TODAY'S SPEED LATHES
2060 READING ROAD CINCINNATI 2, OHIO



SAVES 50¢ ON THE DOLLAR

This welding shop had been using small air grinders with cone wheels to grind fillet welds in jigs. They called in the Rotor Application Engineer to step up production. In view of the large amount of grinding involved, he suggested a High Cycle installation with Rotor Right Angle Grinders with 6" flared cup wheels properly dressed to reach corner welds. These tools were installed. Results:

50% decrease in grinding costs due to:

100% increase in grinding output due to the

higher sustained speed of cutting edge of wheel on work and greater ease of reaching corner welds.

75% saving in power costs due to greater efficiency of high cycle power.

Perhaps the Rotor Application Engineer can help cut *your* costs. Call him. No obligation.

Yours for lower costs,

HIGH CYCLE O'TOOL

AIR

THE

ROTOR TOOL

CLEVELAND, OHIO

HIGH
CYCLE

THE LAST OF THE BIG TOOLS OF PORTABLE

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er, 1946

Who really knows

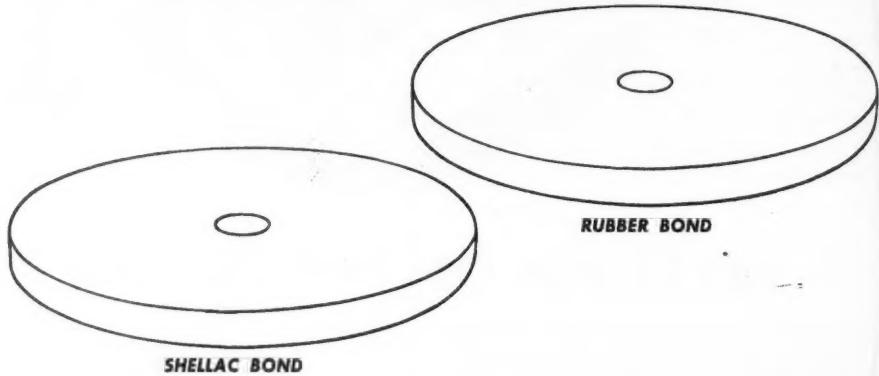


Your experience tells you this is a tough one to answer. You've seen what correct bond selection means in faster, better grinding at less cost. You know the importance of the right bond in terms of maximum cut with minimum pressure and lowest wheel loss.

You have probably seen one of your own shop experts worried with what seemed a logical choice. For, there's plenty of room for error in evaluating the many variable factors involved.

For instance, the speed of the grinder, tolerance limits, or production schedules are but a few of many factors to be considered. Yet, neglecting one...even partially...will upset the calculated performance of the wheel you choose.

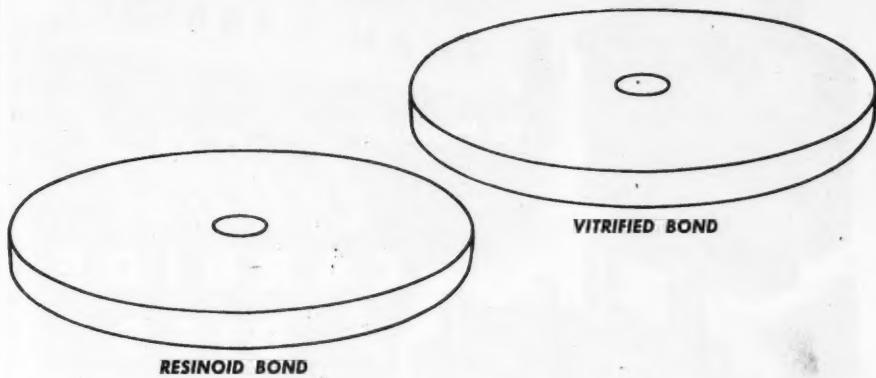
To help you make the best choice of wheels, CARBORUNDUM has organized a system of checks and balances. It offers you a practical service...service easy to use...service depended on by many successful concerns.



*A good rule for good grinding... **CALL***



what bond is best?



CARBORUNDUM salesmen and our distributor's representatives are your contact with this service. They are familiar with your needs. They are informed on latest abrasive developments. Supporting them in the field are our Abrasive Engineers...qualified to solve tough grinding problems. And here, in the modern laboratories of CARBORUNDUM, are scientists and technicians probing grinding practices in the light of abrasive development. As a result, they usually

come up with the most direct solution to difficult grinding problems.

There is no better way to find out what bond is really best, or what wheel to use, than to depend on this organized service. It is a smooth working combination of knowledge and experience. Call in CARBORUNDUM. There is no surer means of making certain you are getting the best. The Carborundum Company, Niagara Falls, New York.

IN CARBORUNDUM

TRADE MARK

BONDED ABRASIVES

WHEELS

- Silicon Carbide
- Aluminum Oxide
- Diamond
- Cylinder Hones
- Sticks, Stones & Rubs
- Specialties

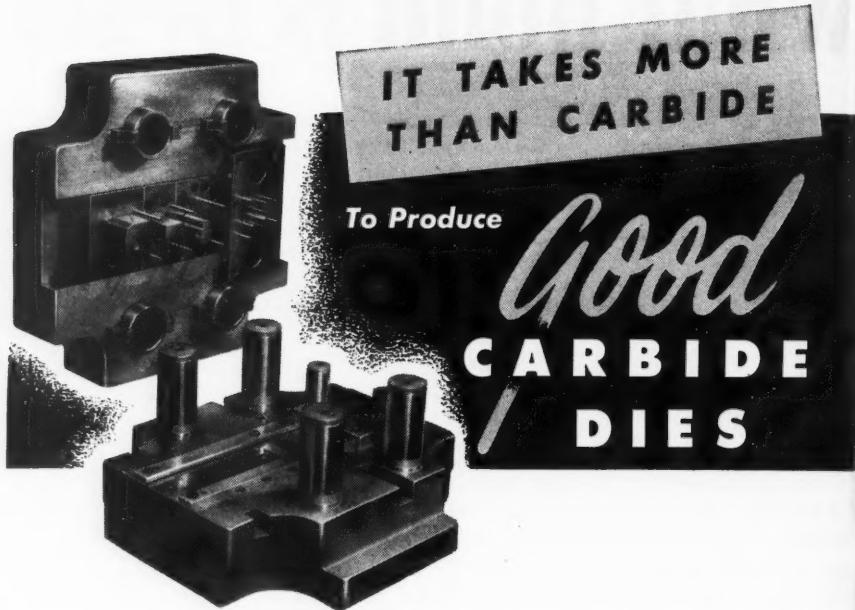
COATED ABRASIVES

- Paper, Cloth and Combination
- Sheets, Rolls, Discs

ABRASIVE GRAINS AND COMPOUNDS

- for:
- Polishing
- Lapping
- Pressure Blasting
- Finishing

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company



Dies made of tungsten carbide will provide exceptional production economies if they are properly engineered and made to take full advantage of the remarkable durability of this material.

Observe how this has been done in the die illustrated above. Note the heavy construction of the die shoe and punch holder—the application of tungsten carbide to all guide pins and bushings in addition to the punches and die sections. Also, here is the necessary accuracy of workmanship which, combined with proper design, assures the user of good and lasting performance.

With more than 10 years' experience in precision applications of tungsten carbide, Lincoln Park has a thorough understanding of how this material can be and should be used. This knowledge—gage-makers' precision—and unexcelled production facilities are back of every carbide die built by Lincoln Park.

We'll be glad to submit quotations on any of your dies which are suitable for carbide applications.

 *Lincoln Park* INDUSTRIES, INC.
1733 FERRIS AVENUE • DETROIT 25, MICHIGAN



6 Ways to Cut Costs by Increased Production with GEMCO SHAPERS

Appreciable savings in floor-to-floor time can be effected, per work piece, with these tried-and-proved advantages of GEMCO Shapers:

1 **WIDE RANGE OF FEEDS.** Selection of 18 feeds may be made while ram is in motion. Feed-adjusting lever is self-locking.

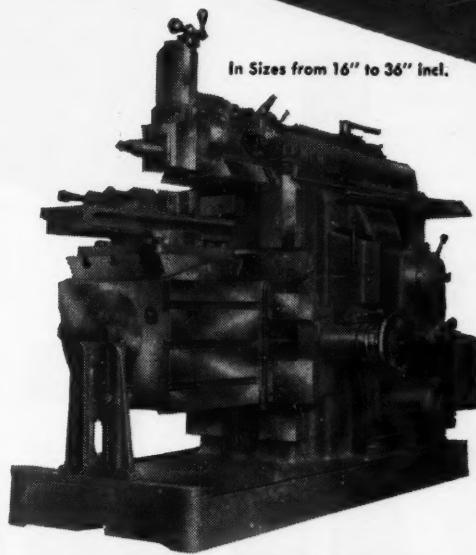
2 **8 RAM SPEEDS.** Each speed quickly obtained by readily accessible shift levers.

3 **CONTROLS CENTRALIZED** and large easy-to-read dials assure greater convenience for operator, thereby increasing operational speed.

4 **SAFETY HAND WHEEL.** Manual table feed is positively controlled at all times. Eliminates "fishing" for crank handle.

5 **FORCED FEED LUBRICATION.** Fully automatic. Filtered oil continuously furnished under constant pressure. Patented "Lubrigard" insures against lubrication failure.

6 **TIME-SAVING ACCESSORIES.** Power Down Feed, Power Rapid Traverse, Convex Attachment, Extended Head, Index Centers, Auxiliary Table.



In Sizes from 16" to 36" incl.

GEMCO

Multi-Purpose SHAPERS

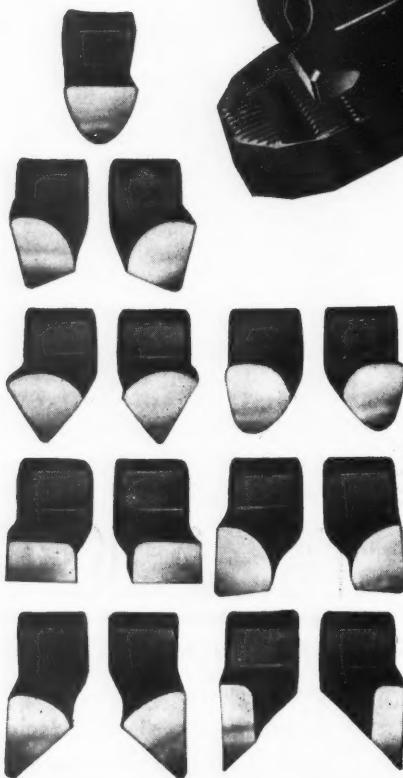
THE Universal type of GEMCO Shaper, shown here, is ideal for tool and die work, or where angular setups are required. Its exclusive "Lubrigard" Safety Device increases the precision life.

WRITE TODAY FOR BULLETIN GC-12 3.

**GENERAL
ENGINEERING
& MFG. CO.**

ST. LOUIS 16, MO. MANUFACTURERS OF PRECISION MACHINERY SINCE 1917

INFINITELY MORE USEFUL THAN ANY SOLID TOOL BIT!



**One
OK Tool Set
Handles Hundreds
of
Metal Cutting Jobs**

Supplied in sizes and shapes for all single-point metal cutting, OK Tool Holders and Bits enable you to get top production out of any make of lathe, planer, shaper or boring mill. No matter how difficult the job, there is always a bit or blade available.

OK Holders are made of alloy steel, heat treated for extreme strength and toughness—good for years of service. The cutting bits are drop-forged, best selected high speed steel, heat treated for maximum performance. Cast alloy and carbide-tipped bits are also supplied.

In the OK System, the bit is securely held in a serrated seat by a patented locking device. The fullest sidewise adjustment is possible, insuring the most economic use of cutting steel. A single OK Tool Holder, with a set of bits, will replace many of your solid tools—do your work at higher speeds and feeds. Available at your regular supply source, and the help of our Engineering Department is always at your service.

TRADE
OK
MARK

INSERTED-BLADE METAL CUTTING
TOOL SYSTEM
MANUFACTURED ONLY BY THE **OK TOOL COMPANY, SHELTON, CONN., U. S. A.**

Div. of Aerodynamic Research Corp.

5 Different Types And They're All . . . *Hy-Draulic*

Whatever you may require of your shaper or planer equipment, there's a Rockford Hy-Draulic machine tool to meet your needs. Because Rockford machines are Hy-Draulic they offer many important advantages in easier operation, speed, quality of work, and low overall costs. Rockford Hy-Draulic planers and shapers are built in a wide range of sizes and in five basic types.

1 RAM-TYPE SHAPERS . . . available in rated stroke sizes of 12", 16", 20", 24", and 28". A special 24" machine is also built with non-standard table specifications for specialized work.

2 OPENSIDE SHAPER . . . built in 36" table stroke size. Provides shaper speeds and rigid mounting for tool.

3 SLOTTERS . . . Ram assembly may be set in a tilted plane up to 10° off-vertical. Table provides longitudinal, transverse and rotary feed. Built in 12", 20" and 36" rated stroke sizes.

4 SHAPER-PLANERS . . . of practical use in a wide range of applications where smaller-type planer work must be done. Built in stroke sizes of 42", 66", 90", 120", and 144".

5 PLANERS . . . Double-Housing and Openside . . . each type built in four rated sizes from 36"x 36" to 60"x60"; maximum stroke lengths of 10, 12, 14, 16, 18, or 20 feet available in each size.

Information on all Rockford Hy-Draulic machine tools will be sent promptly upon request. Write for Catalog 1946 . . . your inquiry is invited.

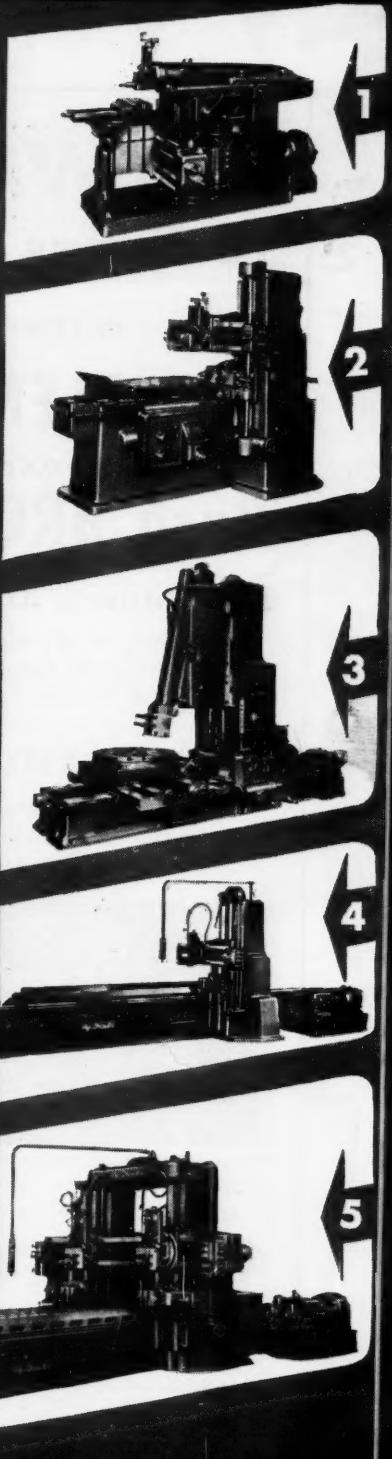
ROCKFORD MACHINE TOOL CO.

Rockford

Illinois

4612

Hy-Draulic



KEYWAYS... 10 Times Faster

WITH

THE GLENNY *adjustable-expansion* Push BROACH

Maintains $\pm .0005$ Accuracy

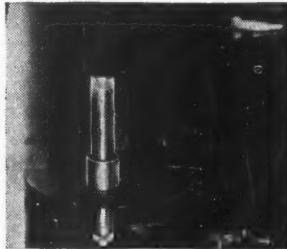
Broaches slots of greatest accuracy to an average length of five inches and up to $5/8"$ widths. May be used on Arbor Presses, Lathes, Screw Machines and other equipment.



Steel
Bushing —
Keyway cut
3/16" deep, 3/8"
wide—in production
quantities.

10 TIMES FASTER THAN ORDINARY METHODS

The bushing illustrated was slotted with a Glenny Broach in one-tenth of the time required by a shaper for the same operation. Full information in Bulletin 9. Send for it today.



Glenny Broach in use on
an Arbor Press



Glenny Broach in series with
other tools for multiple oper-
ations on a Turret Lathe.



Patent
No. 2,184,383



Dept. B EAST SHORE MACHINE PRODUCTS CO.

835 East 140th Street



Cleveland 10, Ohio, U.S.A.

FORMSPRAG

THE FULL COMPLEMENT

Over-Running Clutch

IN A WIDE RANGE OF STANDARDIZED SIZES

Formsprag is now available in standardized sizes that meet most requirements of the design engineer. These sizes cover a wide range in capacities. The plain bearing types, for instance, have torque capacities running from 240 to 1000 inch pounds, and bores from $\frac{3}{8}$ " to 4". The ball bearing clutch is also made in a wide range of sizes.

In Formsprag there is no lost motion, no backsliding or slipping. It overruns freely at the slightest reduction in the speed of the driving member, and engages smoothly and positively. Formsprag is enthusiastically endorsed by the manufacturers of lead wrapping machines, box making machines, spring coilers, canning machinery, punch and feeds, textile weaving machines, paper and paper calendars, printing presses, dual power units, dry cleaning equipment, machine tools and many other types of equipment.

The standardized line meets most requirements, but where special applications are necessary our engineers will gladly make recommendations.

EXCELSIOR PERFORMANCE

The performance of FORMSPRAG, in many diversified industries, offers harmony to Geargrind's sound engineering, precision manufacture and proper application.

Full Complement of Sprags

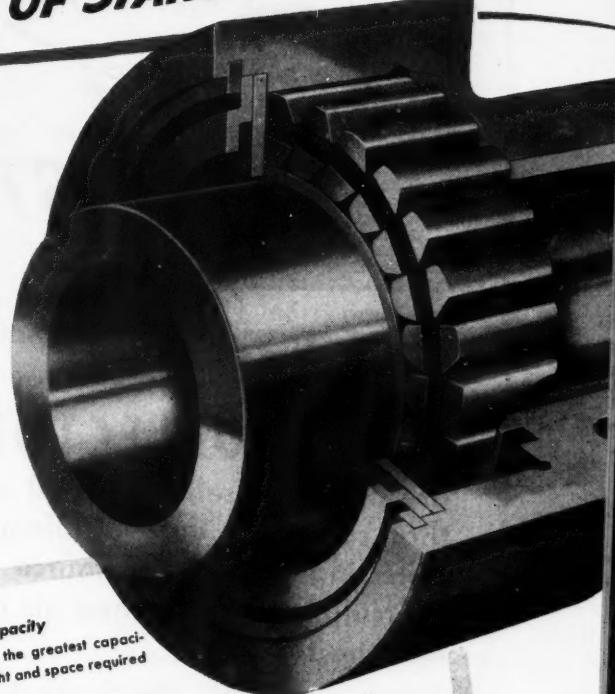
With the annular space between driving and driven members completely filled with sprags, there is no need for cages to position them. Torque load, therefore, is distributed over the greatest possible area. Longer life is the result.

High Torque Capacity

Formsprag offers the greatest capacities for size, weight and space required for installation.

Simple Construction

Cylindrical inner and outer races on which no localized wear can develop. No internal or external cams. No cages. End notches shaped to retain energizing spring and protect sprag gripping surfaces against concentrated end load. Easy installation.



WRITE FOR LITERATURE

Give full information—a description of the operation, normal and maximum torque at specified speeds, the number of times per minute the clutch engages and disengages, and other pertinent information.

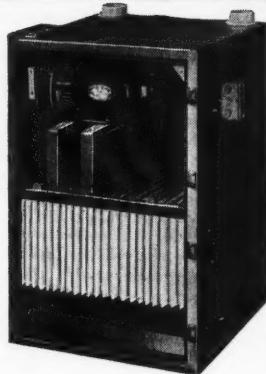
**GEAR GRINDING
MACHINE COMPANY**
DETROIT II, MICH. U.S.A.



TORIT

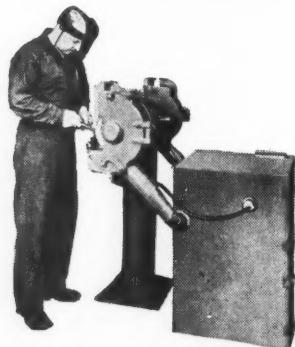
DUST COLLECTORS

are portable, self-contained units that solve the dust problem by collecting dust at its source and recirculating the cleaned air back into the room.



Handle your dust problem simply and easily with TORIT Dust Collectors . . . no pipe lines . . . no exhaust problems. Attached right at the machine they can be moved to fit new production layouts.

TORIT Dust Collectors range in size from $\frac{1}{3}$ HP to 3 HP. There is a model that will meet all your requirements. For complete information and the latest TORIT catalog write:



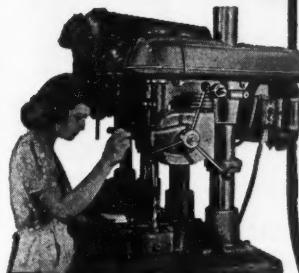
TORIT MANUFACTURING CO.
296 Walnut Street St. Paul 2, Minn.

14" METAL CUTTING BAND SAW

Speeds:

61 to 4630 s.f.m.—

*Price: \$153.00 less
base and motor.



20" 4-spindle, power feed Drill Press. Spindle travel 6".

Speeds: 260 to 2600 r.p.m. with standard motors. 85 r.p.m. with special gear reduced motor.

*Price: \$1314.00 less motor.
Available with 1 to 6 spindles,
hand or power feed.

"Paid in Full"

Each of the Walker-Turner Machines shown on this page has long since "paid in full" its low initial cost in savings due to its increased production over the heavier and less flexible tools which they replaced.

In fact, the investment is so low that it is profitable to employ them as part time workers on jobs that were not completely mechanized before.

Used by the thousands on 24-hour day schedules for volume production during the past ten years, they are now being purchased to tool up for low costs in the competitive markets to come.

Plan your operations to speed up production in many directions with Walker-Turner Machine Tools—and use the guidance of your nearest Walker-Turner Distributor.

*F.O.B. Plainfield—slightly higher west of the Rockies and in Canada
SOLD ONLY BY AUTHORIZED INDUSTRIAL MACHINERY DISTRIBUTORS

43

walker-
turner
COMPANY, INC.
PLAINFIELD, N.J.
U.S.A.

MACHINE TOOLS

DRILL PRESSES—HAND AND POWER FEED • RADIAL DRILLS • RADIAL SAWS
METAL-CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES
RADIAL CUT OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS

Look to SCHERR

for latest developments in
precision-production aids

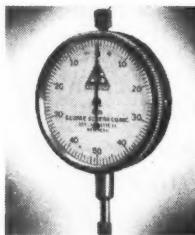
Measure to "tenths" at no extra cost

Without adding to the cost of the tool, the new Scherr Micrometer gives you a sharply inscribed vernier on the barrel which enables quick and accurate readings to $1/10,000"$. With this mike you can meet modern precision requirements in which "tenths" are common. It brings measuring up to date.

The Scherr Micrometer, made for many years under the name of "Reed," has the same long-lived accuracy and smooth, sensitive "feel" which have always distinguished it. 1", 2" and 3" models have the "tenths" vernier. Larger sizes read in thousandths. Sizes to 6" available at once, for immediate delivery. Price, 1", with locknut and ratchet, \$10.50. 1", no locknut and ratchet, \$9.00.

Also made in metric calibration, with and without locknut and ratchet.

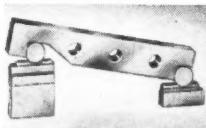
DIAL TEST INDICATOR



A superior instrument. Dust-proof case, unbreakable crystal. Stainless steel and bronze mechanism. Only 3 moving parts. Plunger hardened and ground. Dial adjustable for zero setting. Types with plain back or with universal ball joint. Various contact points. Clamp base or Scherr magnetic base which makes clamping unnecessary.

SINE BAR

Thoroughly normalized, and carrying the Scherr accuracy guarantee. Type G has ground edges. Type L, lapped edges. Two sizes—1" x $\frac{3}{8}$ " x 5", and 1" x $1\frac{1}{4}$ " x 5". Extremely low price makes this valuable tool available for the individual owner as well as in quantity for the toolroom.



PRECISION CALIPERS

Vernier gives reading to .001". Graduated on one side for inside measurement, on reverse side for external measurement. Graduations inscribed by a new photographic etch process to new accuracy and clearness. Several types, 4 sizes 6" to 36". In inch or metric.

EXPORT AGENTS—FOREIGN VISITORS

Call at our extensive show room and examine these tools as well as the Scherr line of production equipment demonstrated under power.

NEW SMALL TOOL CATALOG

Eight pages of data on these and other modern measuring tools, fully illustrated, showing how to check mikes for parallelism and flatness of spindle end and anvil. A valuable booklet FREE AT REQUEST.

GEO. SCHERR CO., Inc.

198-A LAFAYETTE STREET
NEW YORK 12, N.Y.

ONE PART REPLACES THREE

Simple change aids every department

Machine shop saves machining, set-ups
Compare three machined parts with only one. Think of the operations saved, man-hours freed, scheduling simplified, overhead cut.

Assembly dept. saves time, labor
Instead of placing cam on shaft, inserting shaft in holder, then jamming on knurled head, Elk simply inserts the one-piece cammed shaft and applies two Truarc rings.

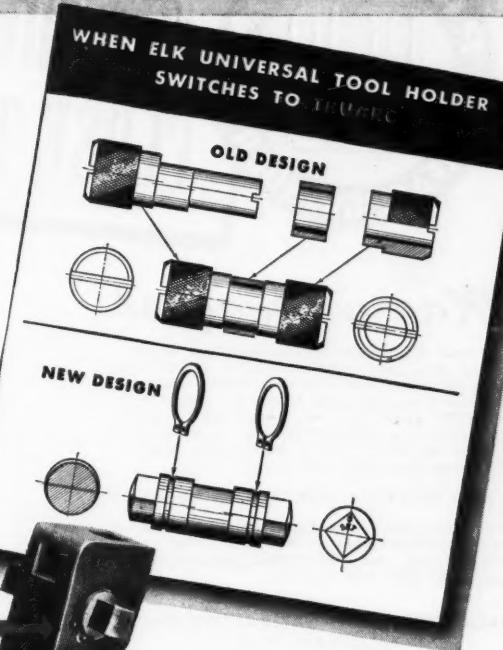
Purchasing dept. saves material, reduces inventory
Old way required three parts, cam, shaft and knob, of varying diameters. Compare with new way requiring one simple part and two standard Truarc rings. Less to buy, less to stock.



WALDES
TRUARC
RETAINING RINGS

U.S. PAT. RE. 18,144.

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, N.Y.



The advantages of this simple redesign were great for Elk Tools, Inc., New York. With Waldes Truarc Retaining Rings you too can reduce machining, save material, eliminate nuts, bolts, cotter pins and other uneconomical devices. Truarc's patented mathematical design assures a never-failing grip. Waldes Truarc engineers can help you improve your product, will give your particular problem individual attention without obligation.

VISIT TRUARC BOOTH • IRON & STEEL SHOW,
CLEVELAND, OHIO, OCT. 1-4

- Waldes Kohinoor, Inc., 47-10 Austel Place, Long Island City 1, N.Y.
Please send Free Catalog on Truarc Retaining Rings to
- NAME _____
- TITLE _____
- FIRM _____
- ADDRESS _____
- CITY. _____ ZONE. _____ STATE _____
- KEY 27G



A CHECK-UP ON CLOSE TOLERANCE

May we suggest

that you check your surface grinding department? Are your machines doing PRECISION work in an efficient and time-saving manner? It's sound reasoning to have this department in "TOP" condition. We want you to know that there's a REID Distributor located convenient to you and he'll gladly give any information you may require on:

REID PRECISION SURFACE GRINDERS.

You'll find this machine capable of bringing your grinding department up to "TOP" performance on your PRECISION work, reducing operating time and expense.

**BALANCED DESIGN—ATTRACTIVE FINISH
MODERATE COST.**

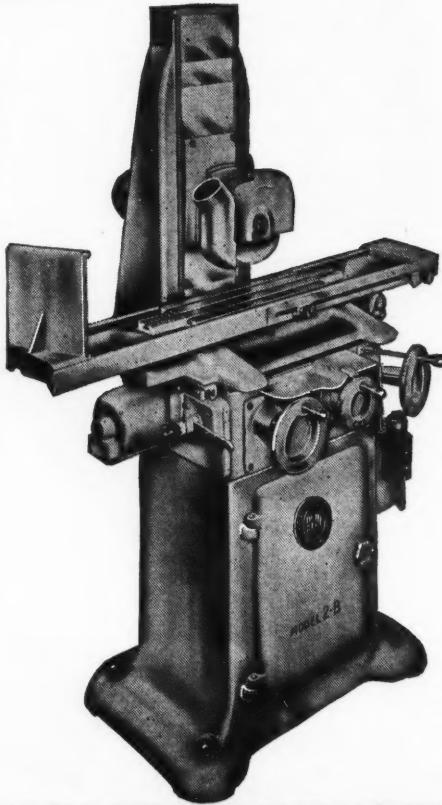
ILLUSTRATED IS THE REID
MODEL 2-B ALL-ELECTRIC POWER-FEED.

THE REID MODEL 2-C HAND-FEED
ALSO IS AN EXCEPTIONAL MACHINE
FOR TOOL, GAGE, DIE AND CERTAIN
PRODUCTION GRINDING.

MACHINES EQUIPPED FOR WET
GRINDING IF REQUIRED.

EXCELLENT DELIVERIES

DISTRIBUTORS CONVENIENTLY
LOCATED IN ALL SECTIONS.
WRITE DEPT. E FOR
ILLUSTRATED BULLETIN AND PRICES.



REID BROTHERS COMPANY, INC.

BEVERLY MASSACHUSETTS

STEP UP LATHE **OUTPUT**

with the new Self-Indexing

Enco HEXTURRET

— the better bed turret



DOUBLE DRIVE

for equalized power

DOUBLE GIBS

for constant accuracy

In today's battle to hold profit margins, Enco's versatile Hexturret provides the speed, accuracy and rigidity that increases lathe output and cuts production costs.

Now vise grip clamping locks turret securely and prevents crawling under heavy cuts. Enco DOUBLE DRIVE assures quick, easy bal-

anced slide movement. Accuracy is protected, operator fatigue reduced.

Enco's many features add up to reduced lathe time on every operation . . . with a saving on unit costs. GET THE FACTS . . . Write today for special illustrated folder and prices.

Patent Pending

ENCO MANUFACTURING COMPANY

General Offices and Factory: 4522-24 Fullerton Ave., Dept. 110, Chicago 39, Ill.

Export Division: Engineering Building, 205 W. Wacker Drive, Chicago



ENCO MANUFACTURING COMPANY, Dept. 110,
4522-24 Fullerton Ave., Chicago 39, Ill.
Please send full information on:

Enco Hexturrets

Enco Turret Tool Posts

Name

Address

Town, State

STOP DUST WITH DUSTKOPS



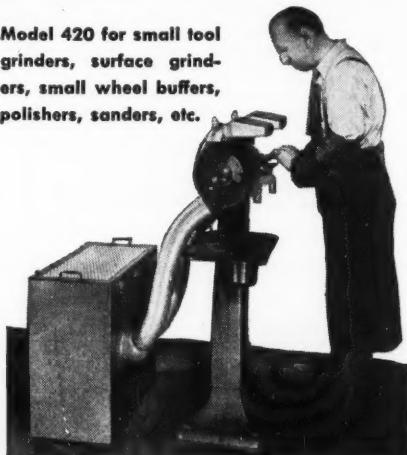
Model 1150 DUSTKOP Dust Collector collects all the chips (note pile in back of DUSTKOP) from aluminum extrusion cut-off. Paddle wheel fan direct driven by continuous duty motor clears any size chip or shaving; cyclone separator for a first stage cleaning is followed by spun glass filtering of air before recirculating to work space.

DUSTKOPS require no duct work: Install in minutes.

New style, low cost, spun glass filter, is fire-safe, easy to shake down and seldom needs renewing.

AGET-DETROIT CO.
604 First National Bldg.
ANN ARBOR, MICHIGAN
Phone 2-5585

**Model 420 for small tool
grinders, surface grinders,
small wheel buffers,
polishers, sanders, etc.**



Ask for complete information NOW on DUSTKOPS.
DUSTKOPS are LOW IN COST, EASY TO INSTALL, FULLY PORTABLE

**3 NEW
SKILGRINDERS
that'll help you
CUT PRODUCTION COSTS!**

**MODEL 310 . . . HIGH SPEED PRECISION
GRINDER FOR FINE, ACCURATE FINISHING**

Here's a lightweight (less than 3 lbs.) grinder with double the power of average grinders of similar capacity...free speed of 22,000 R.P.M. . . perfectly balanced for precision finishing of small openings, irregular molds or for lapping dies where both speed and accuracy are needed. Equipped with $\frac{1}{8}$ in. cap. collet type chuck for a variety of grinding wheels.

**MODEL 310C . . . Similar to Model 310,
equipped with $\frac{1}{8}$ in. cap. Jacobs chuck and key.**

**MODEL 311 . . . FAST SPINDLE TYPE
GRINDER USES $\frac{1}{8}$ IN. TO $2\frac{1}{2}$ IN. WHEELS**

Power-packed, lightweight, smooth-running . . . just what you need for grinding and polishing larger irregular molds, castings and patterns . . . free speed of 15,500 R.P.M. . . fully powered for tough finishing jobs...compact enough for working in tight places.

Ask Your Distributor About a Demonstration!

SKILSAW, INC.
5033-43 Elston Ave., Chicago 30, Ill.
Factory Branches in All Principal Cities



No. 11 Leach Surface Grinder

**EXTRA LARGE
CAPACITY**

6" x 24" x 12"

HEIGHT 52"

WEIGHT 850 lbs.

\$591⁰⁰

Complete with motor of standard Current characteristics
F. O. B. Factory.

**2 SPINDLE SPEEDS
2600 and 3500 R. P. M.**

NATIONAL DISTRIBUTORS

H. LEACH MACHINERY CO.

387 CHARLES ST.

PROVIDENCE 4, R. I.

AGENTS IN ALL PRINCIPAL CITIES

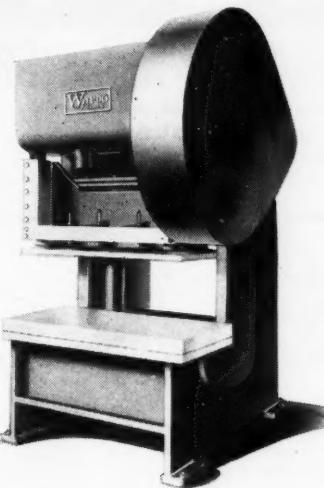
**Engineered for Greater Strength, Rigidity,
Accuracy, Power and Endurance**

Warco PRESSES

WELDED STEEL . . . fully stress-relieved

DOUBLE CRANK GAP PRESS

Capacity 100 to 500 tons, for handling large diameter stock. Gap rigidly reinforced to minimize "spring action" from heavy loads.



How Added Life Is Built Into Warco Presses

- Warco welded steel frames are annealed to prevent locked up stress and to remove danger of misalignment from overload. Stress-relieving adds years to press life and provides unchanging rigidity, strength, accuracy and endurance.

Extensive production facilities enable us to handle orders promptly. Let a Warco engineer help solve your press problem.

We extend an invitation to visit our modern factory at any time

WARREN CITY MANUFACTURING COMPANY

1942 Griswold Street • WARREN, OHIO
A Subsidiary of The Federal Machine and Welder Company
Offices in Principal Cities

ECCENTRIC GEAR PRESSES • OBI PRESSES
HYDRAULIC PRESSES • PRESS BRAKES

BUHR

ANNOUNCES SUPERIZED
BALL BEARING
ADJUSTABLE TYPE

DRILL HEADS

Improved Construction,

Buhr adjustable heads have been used economically for intermittent set ups on short orders and large production jobs. They are made in sizes and number of spindles to fit any ordinary layout of holes. Buhr ball bearing heads have been the pioneers in ball bearing construction and shaved gears. Adapters are separate and are interchangeable from one press to another. They are so constructed the operator can quickly set the head in any desired radial position to suit drill jig and drill press quill.



Induction Hardened Shaved Gears

A FEW OF THE POSSIBLE SPINDLE ARRANGEMENTS OF THE 16-FV HEAD

The 16-FV head shown above has 6 spindles which will carry the maximum size drill of $7/16''$ in cast iron, the minimum distance between spindles $1\frac{1}{2}''$. The diameter of the circle adjustment is $3\frac{3}{4}''$ minimum to $13\frac{1}{4}''$ maximum. The heads are self-contained and parts are running in light grease. Spindles can be finished in 3 types, with Morse tapers, for standard drill chucks, or for Buhr collets.

DELIVERY NOT EXCEEDING 2 WEEKS
On Models 0-2, 0-3, 12, 13, 14, 16 and 18.
Write for Literature or Send Blue Prints.

BUHR Machine Tool Co.
845 GREEN ST.
ANN ARBOR, MICH.

TOOLS for PRECISION PRODUCTION

MEEHANITE is an engineering material with strength properties that place it in competition with other strong metals . . . plus, the many good properties of a good gray iron.

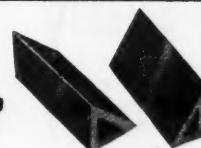
MADE FROM MEEHANITE METAL

Surface Plates

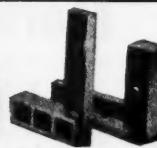
Masterangle Plates



Masterangle Plates



Angle Attachments



Try Squares

Straight Edges

Flat Parallels

Try Squares

Angle Plates

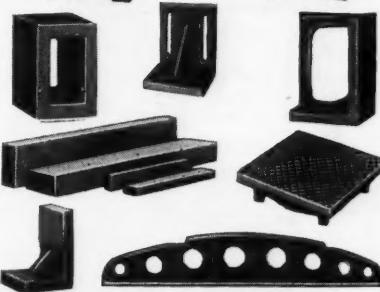


Box Parallels



Lapping Plates

Universal Right Angles
Toolmakers' Knees

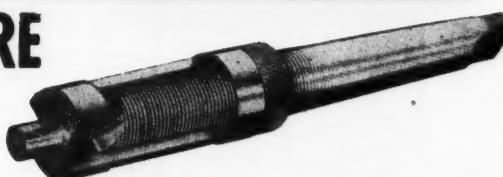


MEEHANITE represents an outstanding development in the metallurgy of gray iron. The process eliminates the undesirable variations of structural constituents which occur in common gray iron. A new material is created in which the structural form of the matrix and the quantity and distribution of the graphite are under actual control.

Write for Literature

COUNTERBORE and

SPOT FACER



with MOVABLE INSERTED CUTTERS

Made in 50 Standard Sizes from 9/16" to 3½" diameter. Features include—easy removal of cutter for sharpening, cutting edge of cutter always in same location, cutter locks securely, pilot drilled and tapped to hold different size bushings, etc.

PROMPT DELIVERY

• WRITE FOR LITERATURE

ACME TOOL COMPANY

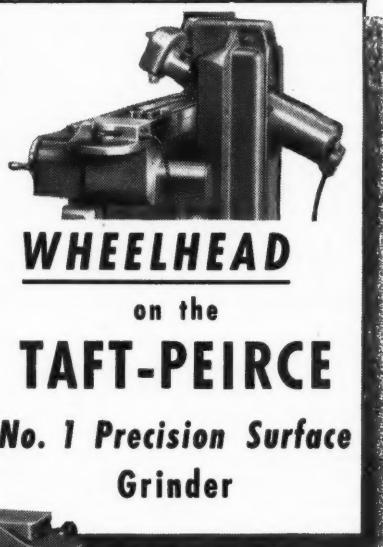
96 WARREN STREET

NEW YORK 7, N. Y.



**Handle a Wider Range of Jobs
More Easily
and Quickly**

...with this TLTING



WHEELHEAD

on the

TAFT-PEIRCE

**No. 1 Precision Surface
Grinder**

THIS EXCLUSIVE FEATURE makes quick and simple work of many operations which—on other machines—require slow and complicated tool set-ups. More than that, the *tilting wheelhead* provides ready adaptability to difficult angle and shoulder work.

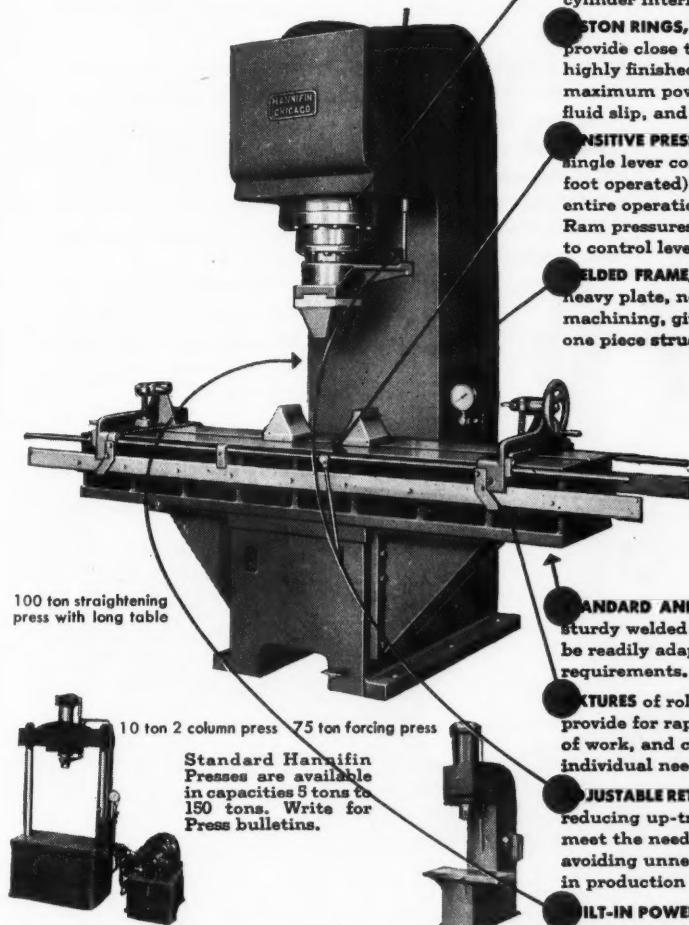
The wheel-spindle swivels in a vertical plane about the center of the wheel. The spindle is carried in a block mounted between two pairs of circular dovetail slides, permitting swivelling of the entire spindle about the wheel center through an arc from horizontal to 30° below center. This facilitates the grinding of tools, gages and small parts which require the highest degree of accuracy and flatness.

For full details on this and other exclusive features of the Taft-Peirce No. 1 Precision Surface Grinder—which is like no other machine for comparable work—write for illustrated bulletin.

THE TAFT-PEIRCE MFG. COMPANY
Woonsocket, Rhode Island



You will approve these Press Features



Hannifin Hydraulic Press design provides all the advantages of standardized construction, plus flexibility that allows modification to meet individual needs. Among the many features of design and construction that mean long life and efficient performance are:

PRECISION CYLINDERS, of high tensile iron, bored and honed, produce mirror finish precision cylinder interior.

STON RINGS, of precision type, provide close tolerance fit in the highly finished cylinder, for maximum power, minimum fluid slip, and lifetime service.

SENSITIVE PRESSURE CONTROL, a single lever control (hand or foot operated) controls the entire operation of the press. Ram pressures are in proportion to control lever movement.

WELDED FRAME, fabricated of heavy plate, normalized before machining, gives a simple, rigid, one piece structure.

STANDARD AND SPECIAL TABLES, of sturdy welded construction, can be readily adapted to individual requirements.

MUTURES of roller or center type, provide for rapid easy handling of work, and can be adapted to individual needs.

ADJUSTABLE RETURN STROKE, allows reducing up-travel of ram to meet the needs of the work, avoiding unnecessary ram travel in production operations.

BUILT-IN POWER, a compact, motor driven hydraulic power unit, requires only electrical connections.

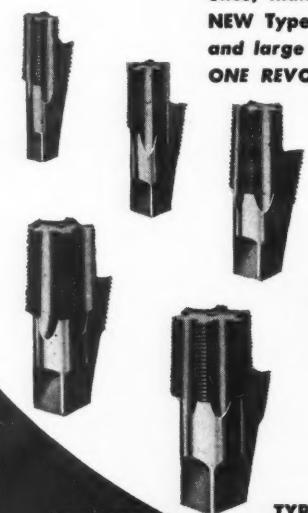
HANNIFIN MANUFACTURING COMPANY
621-631 SOUTH KOLMAR AVENUE • CHICAGO 24, ILLINOIS

... A "REVOLUTION" IN MACHINING INDUSTRY ...

TOUGH Threading jobs licked by
COULTER TYPE "H"
THREAD TAP MILLING MACHINE

NOW . . . comes a development that extends the capacity of this 'wonder' machine. COULTERS are made to perform the most delicate threading operation with both speed and accuracy . . . 40 years of specialized experience, manufacturing precision machines exclusively. The NEW Type "H" is equipped with an overarm tail center and large collet chuck, holding the work rigidly so **ONLY ONE REVOLUTION OF THE TAP** is necessary.

Any number of FLUTES, eccentric or con-eccentric relief straight or taper can be produced. Pipe taps from $\frac{1}{8}$ " to $1\frac{1}{2}$ " and straight taps from $\frac{1}{4}$ " to $1\frac{1}{2}$ "



TYPE H

WRITE FOR
FULL PARTICULARS

PRODUCTION MACHINES
SINCE 1896

The James **COULTER** Machine Co.
BRIDGEPORT • CONNECTICUT • U. S. A.



The KEY to CUTTER GRINDING PROBLEMS

GRINDS DIFFICULT CUTTERS EASILY

"THE OLIVER ACE"

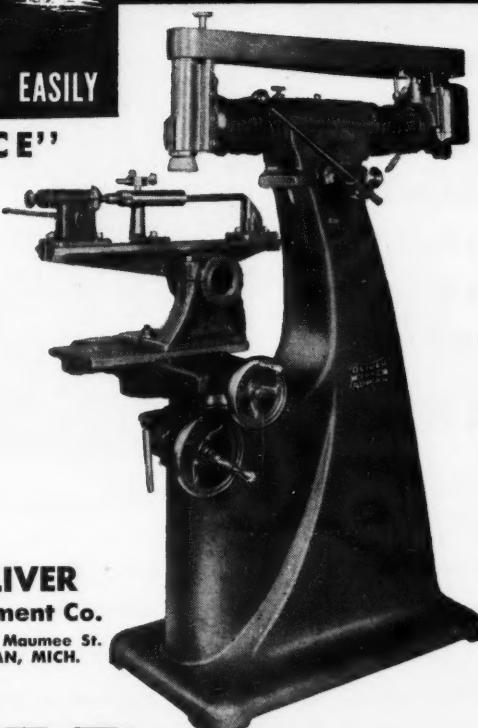
Keep production lines moving with cutters sharpened on the ACE . . . It is efficient for sharpening face mills up to 15" . . . slitting saws . . . mill ends . . . angular cutters . . . slab mills . . . dovetail cutters . . . reamers . . . taper reamers . . . gear cutters . . . double angle cutters. Fellows helical cutters . . . production gashing . . . radial relief grinding . . . and newer uses are found every day.

It is easy to operate . . . simple to set up . . . the ACE keeps the work before the eye with no bending . . . no squatting . . . no squinting . . . saves the operator from work fatigue.

"You can cut grinding costs with the ACE."

Write for Illustrated
Literature.

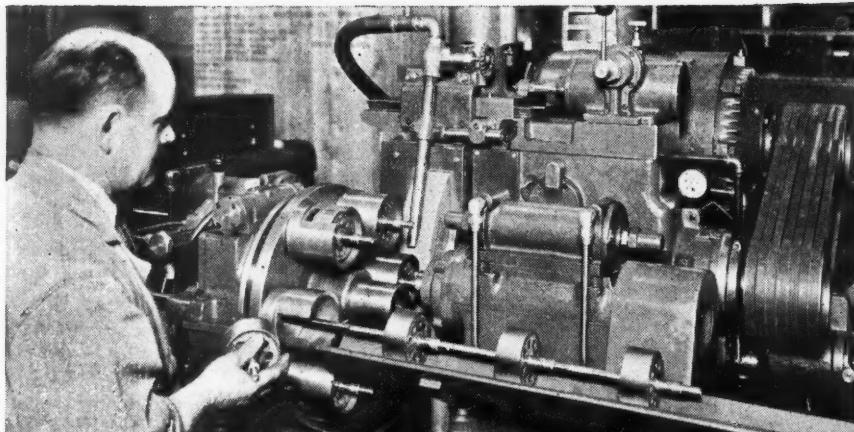
OLIVER
Instrument Co.
1430 E. Maumee St.
ADRIAN, MICH.



IMPROVE YOUR TOOLROOM
IT'S THE BACKBONE
OF PRODUCTION

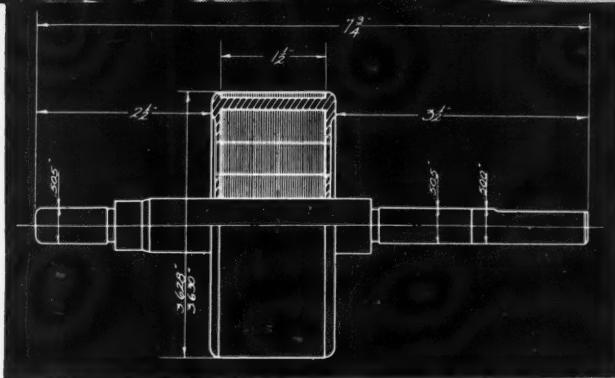
OLIVER
OF ADRIAN

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
TOOL GRINDERS—FACE MILL
GRINDERS—DIEMAKING MACHINES



**Another
outstanding
cylindrical
grinding job
by—**

ARTER



No. 135 Arter Automatic Cylindrical Grinder

The grinding of the diameter of the laminations of an armature for a washing machine motor is one of the many jobs on which this machine is giving typical ARTER satisfaction. Production—200 pieces per hour. The central taper shaft diameter is ground before assembly with a production rate of 300 per hour.

**ARTER GRINDING MACHINE CO.
WORCESTER, MASSACHUSETTS • U. S. A.**

The *Air Valve* You Have Been Looking For
PILOT OPERATED • SOLENOID CONTROLLED
A New ROSS Piston Poppet Type Valve

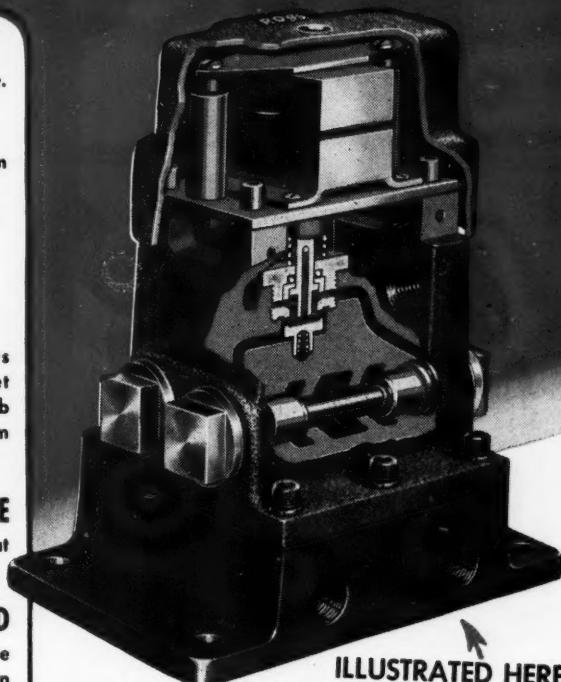
- ✓ **FAST OPERATING**
as high as 400 cycles per minute.
- ✓ **LARGE ORIFICE AREA**
results in fast exhaust, minimum restriction to air flow.
- ✓ **POSITIVE SEAL**
by line pressure.
- ✓ **SIMPLICITY OF DESIGN**
removing end plugs permits replacement of piston poppet assembly — no need to disturb piping or to move valve from position—no "down time".
- ✓ **ECONOMICAL TO OPERATE**
current consumption 1.2 amps. at 110 volts—60 cycle.
- ✓ **LONG SERVICE ASSURED**
many Ross valves installed more than 20 years ago are still in active service.
- ✓ **SMALL AND COMPACT**
appreciated where space is limited.
- ✓ **ALL PARTS**
non-corrosive metals.
- ✓ **ACCURATELY MACHINED**
and all parts interchangeable.

A TYPE AND SIZE
FOR EVERY PURPOSE
*
OVER 100 DIFFERENT MODELS

ROSS
Air Control
VALVES



THE BRIDLE FOR AIR HORSEPOWER



ILLUSTRATED HERE
is the FOUR-WAY = $\frac{3}{8}$ " Capacity

Available in:-

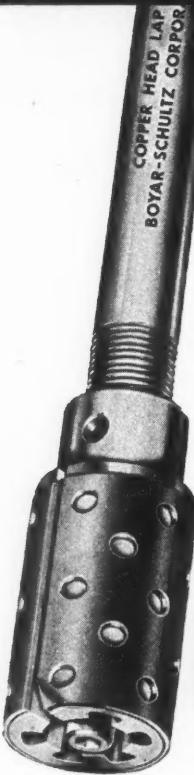
- **THREE-WAY**
normally open, or normally closed
- **FOUR-WAY** and
- **FOUR-WAY, Five port.**
may be had in $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ " pipe size

ROSS Operating VALVE CO.

6484 Epworth Blvd. Detroit 10, Mich.

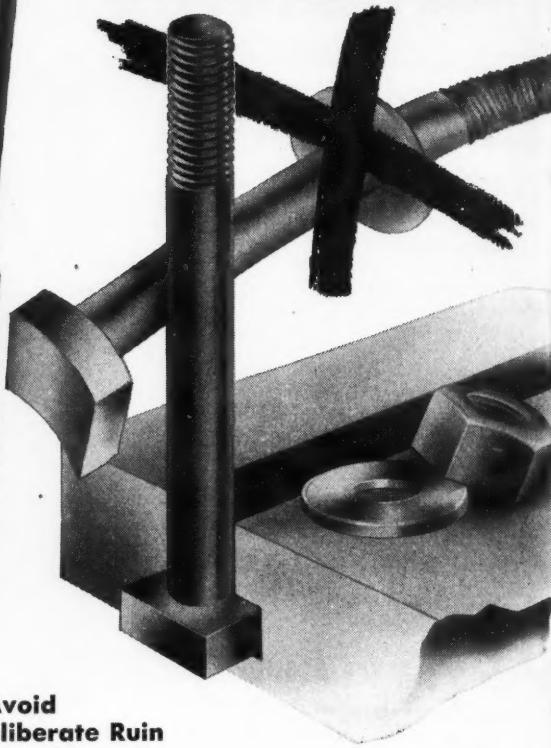
or a
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n a

COPPER HEAD LAP



. . . They pay for themselves in time saved! They work fast; they never wear out. The only wearing part is the replaceable sleeve. Sleeve adjustment feature permits maintaining correctlapping size till worn out and replaced with a new sleeve. Costly toolroom time is saved by using Boyer-Schultz Copper Head Laps. Available from stock in standard sizes $\frac{1}{8}$ " to $2\frac{1}{2}$ ".

BOYAR-SCHULTZ SPECIAL T-SLOT BOLTS



"Avoid Deliberate Ruin of Machinery"

"Most metal working machinery is provided with T-slots in Tables for fastening work. In modern production these T-slots are completely finished by milling or planing; consequently every surface is finished smooth and square. But when machines are put in operation, any kind of hodge-podge bolt is used for fastening work. It does not take long to ruin T-slots with such bolts, and after that has happened, a most essential part of the machine is ruined. The cost of proper bolts is very small, and I hope that my observations expressed here will reach the men in authority to *avoid this deliberate ruin of American Machinery.*"

Above is from a letter to Tool Engineer, January 1946.
Boyar-Schultz Special T-Slot Bolts are made from upset forgings of heat treated alloy steels. Machined heads are square with bodies to present a clean flat surface to T-slot. Threads are carefully cut. For best results use Nuts and Washers made for use with Boyar-Schultz Special T-Slot Bolts.

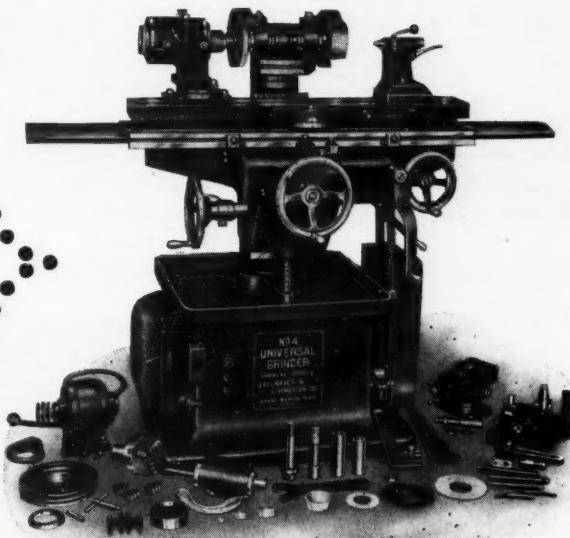
BOYAR-SCHULTZ CORPORATION • 2120 Walnut St. • Chicago 12

TO HANDLE COMPLEX TOOL GRINDING JOBS

with maximum speed and convenience

use G&L's GRAND RAPIDS No.4

Universal Cutter and Tool Grinder



CONVENIENT OPERATION permits control of machine from either front or rear. Power feed providing 6 longitudinal table speeds and wet grinding are available.

EXTREME FLEXIBILITY
The No. 4 Universal Cutter and Tool Grinder permits two ways of performing nearly every operation: 1. With the spindle head locked, the sleeve and knee swivel around the column; 2. With the sleeve locked the head swivels on the column.

VERSATILITY of the No.4 Universal Cutter and Tool Grinder makes all of the following grinding jobs practical and simple:

EAR CUTTER GRINDING

ANGLE CUTTER GRINDING

INTERNAL GRINDING

CYLINDRICAL GRINDING

FACE GRINDING

FACE MILL GRINDING

END MILL GRINDING

FORMED CUTTER GRINDING

SURFACE GRINDING

JOB GRINDING

Write for Bulletin 1045



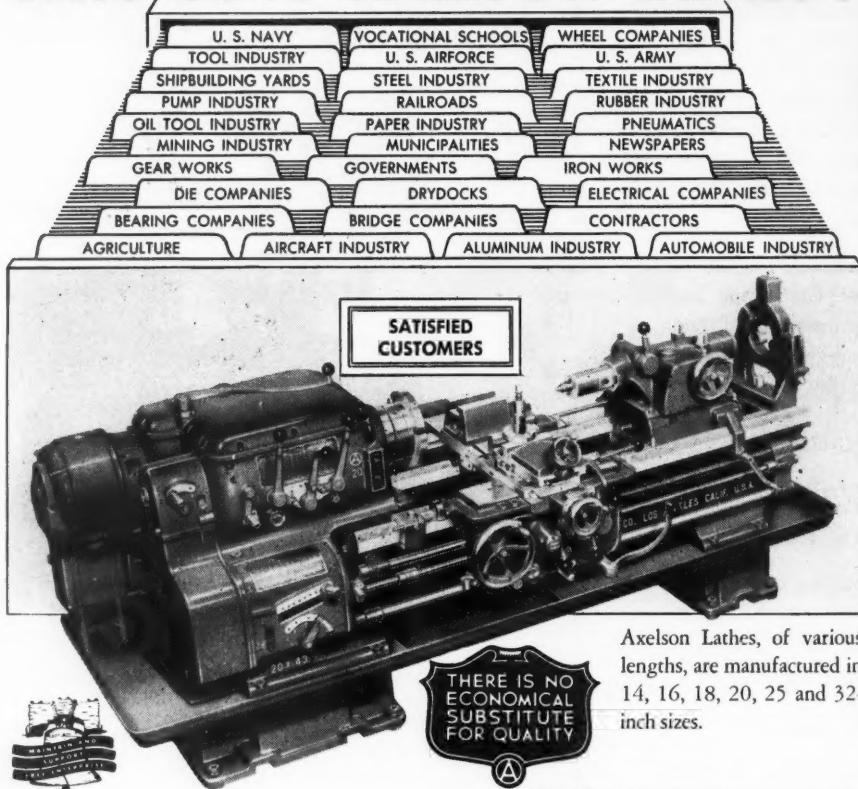
What "GRAND RAPIDS" Quality Means: G & L cast their own close-grained gray iron, machine all parts to micrometric tolerances, and precision-assemble grinding machinery of unsurpassed performance. *Grand Rapids* means *top* quality in grinding machinery.

GALLMEYER & LIVINGSTON CO., 308 STRAIGHT ST., S. W., GRAND RAPIDS 4, MICH.

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WHO BUYS AXELSON LATHES?

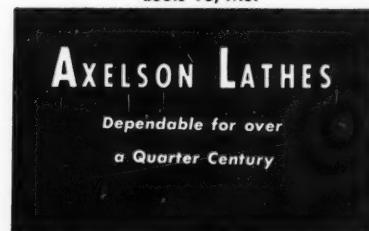


Axelson Lathes, of various lengths, are manufactured in 14, 16, 18, 20, 25 and 32-inch sizes.

Axelson Lathes are a blue-ribbon machine tool recognized and used by the major industries of the United States and by Governments and by leading metal turners all over the world... The list of Axelson customers puts on display a parade of great names in light and heavy industry everywhere. The reason for this is simple. The Axelson heavy duty Lathe is exceptional for it reflects thirty years of determination to achieve quality that will stand out in precision, performance and per-piece economy in operation. A great Lathe ready to serve superbly in the bright industrial future.

THERE IS NO
ECONOMICAL
SUBSTITUTE
FOR QUALITY

AXELSON MANUFACTURING CO.
6160 S. Boyle Ave. (Box 98, Vernon Station), Los Angeles 11, Calif. • 50 Church St., New York City 7 • 3844 Walsh St., St. Louis 16, Mo.





Hollow face and angle of rake

Produced by a generating process which reduces the danger of grinding burns, these edges cut more pieces per sharpening. The angle of rake reduces power consumption.



Stronger teeth

The use of a double angle land, giving the desired cutting clearance without danger of the heel of the land rubbing on the work, makes these stronger teeth practical.



Correct number of teeth

Tooth design permits use of fewer teeth which increases cutting efficiency and enables teeth to be made much stronger with greater chip space.

Correct helix angle

Two types of helix angle provide smooth cutting action . . . a small helix angle for teeth of two lipped spiral end mills for accurate milling of slow and a steep helix angle for teeth of both regular and two lipped end mills for smooth, fast-cutting action.



**Brown & Sharpe Spiral End Mills
cut FASTER, more FREELY
and require LESS POWER**

Fine design features and skilled manufacture give these end mills the qualities essential for fast production. The clean-cut chips with little discoloration—not compressed—not misshapen—are visible evidence of clean cutting action—ability to take many cuts between sharpenings with a long cutter life. Brown & Sharpe End Mills will produce more work for you at lower cost. Write for literature. BROWN & SHARPE MFG. CO., Providence 1, R. I., U.S.A.



We urge buying through the Distributor

BROWN & SHARPE CUTTERS



has
your shop got
the
**"TOOL ROOM
TROTS?"**

How much time is wasted "on the road" while punch press operators and set-up men go back and forth to the tool room to get punches and dies for a short run set-up?

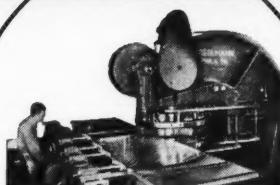
SEE A WIEDEMANN

With a Wiedemann Turret Punch Press, the operator remains at the machine . . . no need to make numerous time consuming "trips," since 11 to 32 punches and dies are carried in the turret . . . ready for instant piercing . . . always at the operator's fingertips. In addition, a Wiedemann saves you hours of layout time. On some machines, layout time is completely eliminated because of material handling gauge tables that position the material ready for piercing by obtaining the X and Y coordinate from blueprints or charts.

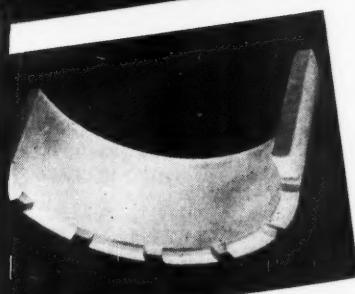
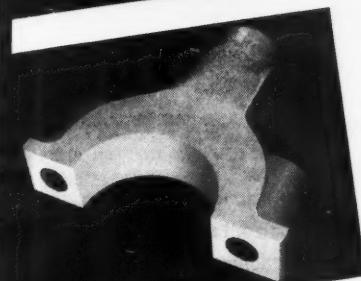
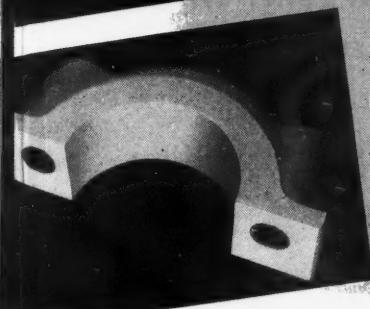
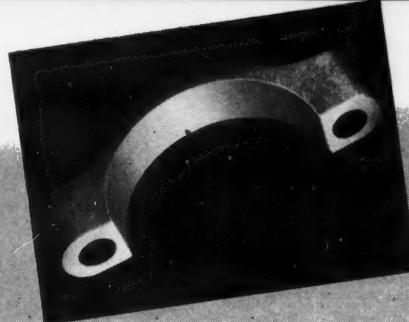
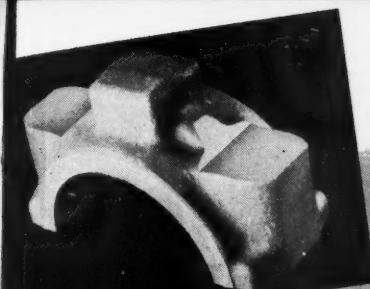
WIEDEMANN MACHINE COMPANY

1821 SEDGLEY AVENUE • PHILADELPHIA 32, PENNA.

Send today for the complete story of short run piercing economy . . . Bulletin 92 . . . and then if you'd like to see a Wiedemann in operation, we'll tell you the shop nearest you that does short run piercing with a Wiedemann.

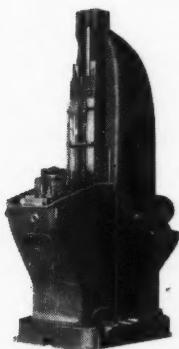


This Type R-7 Turret Punch Press cut production time from over 12 hours to 73 minutes on short run jobs. Got the proof?



Surface Broaching OF BEARINGS AND CAPS

★ There are many applications of Footbur Surface Broaching in the broaching of various styles of bearings, connecting rod caps and main bearing caps. We will be glad to work with you in solving your machinery problems, giving you the benefit of our years of experience in applying surface broaching to many difficult types of work. Just send us blueprints of your parts with hourly production requirements.



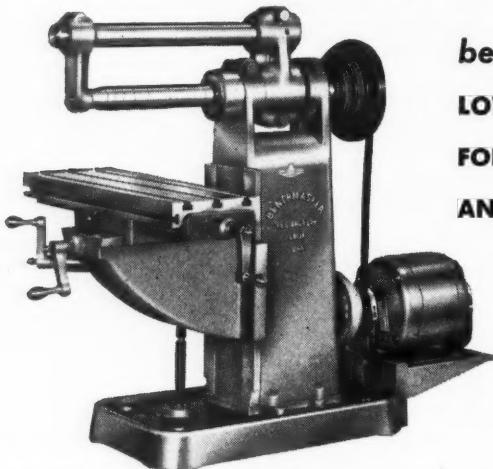
Footbur Single Slide
Broaching Machine

THE FOOTE-BURT COMPANY
CLEVELAND 8, OHIO
Detroit Office: General Motors Building

Footbur Patented Tooth Form

FOOTBURT *Surface Broaching*

ONE for TWO jobs



**benchmaster OFFERS A
LOW-PRICED BENCH MACHINE
FOR BOTH HORIZONTAL
AND VERTICAL MILLING**

*benchmaster mill with
horizontal spindle overarm*

SAVES VALUABLE SPACE—CUTS DOWN EQUIPMENT COSTS

Now you can obtain a precision perfect, high-speed *benchmaster* milling machine that's easily convertible from a horizontal to a vertical miller by simply interchanging spindle attachments. Its unusual versatility, plus the *usual* quality-plus *benchmaster* workmanship, make this double-duty milling machine an outstanding addition to your shop.

SPECIFICATIONS: Table size—6"x 14"—Three Tee Slots $\frac{3}{8}$ ", 2" center Longitudinal travel $8\frac{1}{2}$ "—Traverse travel $5\frac{1}{2}$ "—Vertical travel $8\frac{1}{2}$ " on vertical mill— $9\frac{1}{2}$ " horizontal mill—Height 28"—Weight (less motor) 215 lbs.—Requires $\frac{1}{3}$ h.p. motor—Spindle speeds (standard 1725 rpm motor) 450-850-1400-2100 rpm.

For complete information write to Dept. MM-10.

benchmaster

MANUFACTURING COMPANY
2952 WEST PICO BOULEVARD
LOS ANGELES 6, CALIFORNIA



Everything for SURFACE GRINDING from DoALL



PRECISION SURFACE
GRINDERS (HYDRAULIC)
2 MODELS

LONG LASTING, ALL-
PURPOSE GRINDING
WHEELS

LIFETIME PRECISION,
ADJUSTABLE FORM
DRESSERS AND
DRESSING DIAMONDS

ELECTRO-MAGNETIC
CHUCKS AND
SELECTRON CONTROLS

COOLANT SYSTEMS
FOR WET GRINDING

DUST COLLECTORS
FOR DRY GRINDING

SOLUBLE CUTTING OILS

PRECISION
SURFACE
GRINDER

Whether it's a fine precision surface grinder or any of the accessories for surface grinders, all are available at DoALL. No need to get these from various individual sources when it's so easy to have a DoALL factory-trained engineer check your complete surface grinding requirements. • It's a real revelation to see a DoALL Grinder at work—the last word in producing superfine surface finishes plus high precision in flatness, parallelism and size. • DoALL Selectrons quickly demagnetize electro-magnetic chucks—permitting fast removal of work; no waste of time; no scratching of work. DoALL Coolant and Dust Collecting Systems for wet or dry grinding are designed for long, trouble-free service. Send for Surface Grinder circular today.

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Contour and Zephyr Sawing Machines; Jig-Borers and Radius Slotters; Gage Blocks and Precision Inspection Equipment; Electronic Inspection and Sorting Units; Hardness Testers; Saw Bands; File Bands; Abrasive Bands; Hand and Rotary Files; Tool and Die Steel; Variable Speed Units.

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DOALL STORES
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MACHINE-TOOL DIVISION
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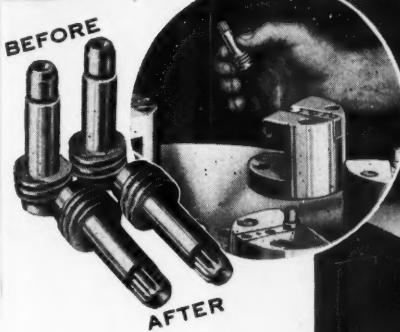
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pumps you need—
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Broaching



-another
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"made-to-order" for

MULTIPRESS

Putting serrations in brass valve-stems proves MULTIPRESS efficiency

- "One-stroke" broaching of brass plumbing-fixture parts like those shown above is easy and economical when you use MULTIPRESS with a standard HydrOILic Index Table. The valve-stems are loaded into specially-built dies by the operator and are *automatically* moved to the broaching position, broached, and unloaded from the die.

This operation calls for a rather heavy "bite"—but you can *preregulate* the MULTIPRESS power load so that neither press nor tooling is endangered if the cutting die meets an off-dimension part. In addition, the pressure load is applied with *smooth uniform velocity*

that avoids fractures and strains in the broached pieces, reduces tool wear and damage. Pressure, speed of operation, and stroke length are easily and quickly regulated.

And you are not limited to broaching operations alone!

Your basic MULTIPRESS is a complete, remarkably compact hydraulic press adaptable to many different jobs. The six-station index table offers extra speed and safety in feeding work into the press.

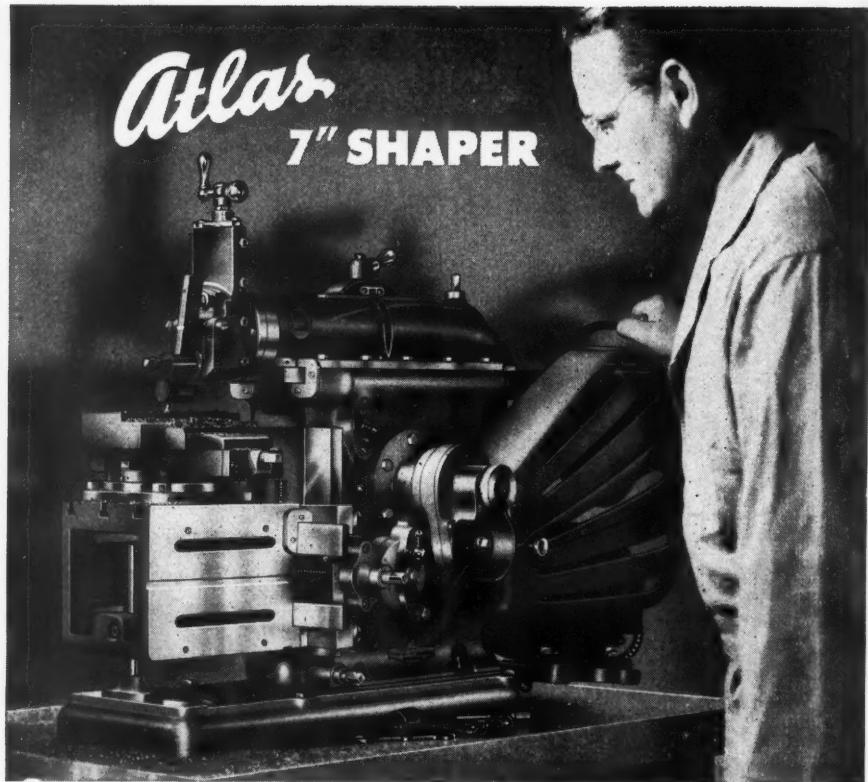
MULTIPRESS is built in 4, 6 and 8-ton capacities, with manual or automatic controls—a size and model for every job. Numerous standard accessories adapt it to a broad range of applications. Write for details, or recommendations on your requirements!

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Atlas 7" SHAPER

QUICKER SET-UPS on Small Parts Operations

"Match the machine to the job" is an idea especially valuable in shaping operations. Most are within the 7" stroke of the Atlas.

PROMPT DELIVERY!

Based on current production increases — unless this "announcement" swamps us — your Atlas distributor can have a Shaper in your plant in a few weeks after you place your order.

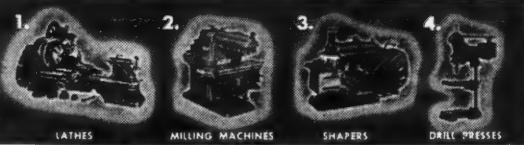
You save on set-up time, machine hour and power costs. The Atlas shaper gives you 4 feeds between 45 and 186 strokes per minute, speeds from $3\frac{1}{2}$ to 116 fpm. Timken bearing equipped. Operates from $\frac{1}{2}$ HP motor. Send for latest catalog.

ATLAS PRESS COMPANY

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4 *Atlas* TOOL TEAM FOR SMALL-PARTS MACHINING



A NEW 20" DRILL

To Meet Your Requirements

FOR ACCURACY

Ruggedly designed for modern production. All parts tooled for interchangeability — Spindle is forged steel and quill has bronze oil-groove bushings — Morse taper as well as table arm is bored in spindle after assembly — table surface held at right angle to spindle to .007 in 6 inches.

FOR SPEED

Convenient controls with long wearing designed mechanism speeds up operator handling — reduces fatigue and chance for spoilage. Table rotates on arm, and both swing on machined columns for working space on base. Automatic feed trip operates through full spindle travel.

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Power is delivered smoothly to give the Sibley 20" a capacity of $1\frac{1}{4}$ " in cast iron or equivalent in other metals. Drive gears of 1:2 and large back gears of 1:4 ratios deliver ample power for every load — Castings are high-tensile, semi-steel. Motor drive is cast integral with the machine base.

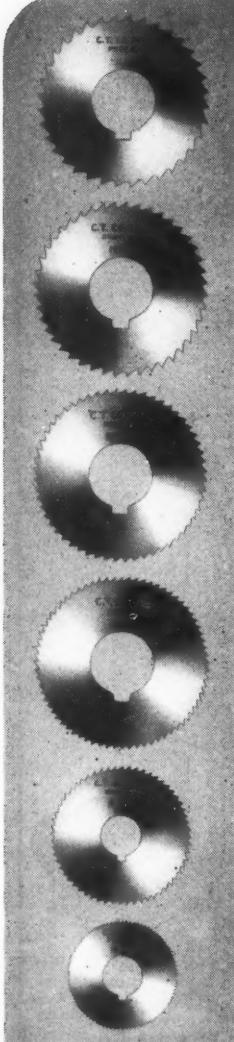
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Immediate Delivery
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Most of America's large screw manufacturers will tell you they **SELECT CIRCLE® SCREW SLOTTING SAWS** because they are almost certain to find the **CIRCLE® SAW** made for their machine and for their screw slotting work.

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2 $\frac{3}{4}$ " Di. — 72-56-44 and 36 Teeth

Order from **CIRCLE R**'s complete and varied stock of screw slotting saws.

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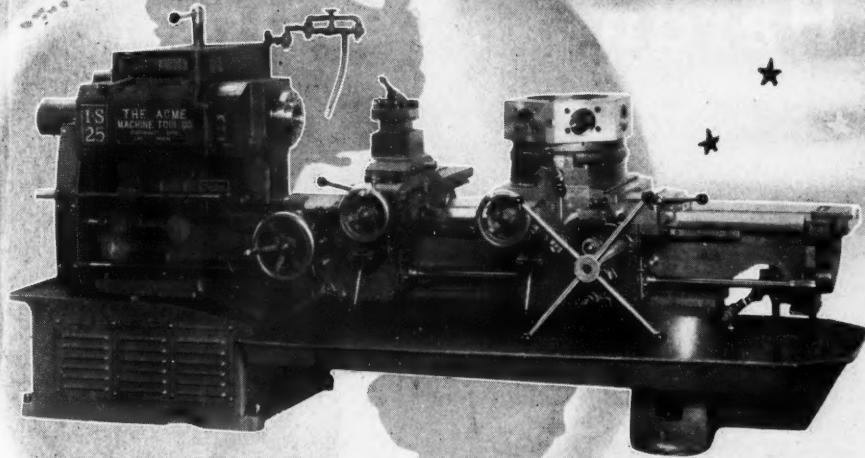


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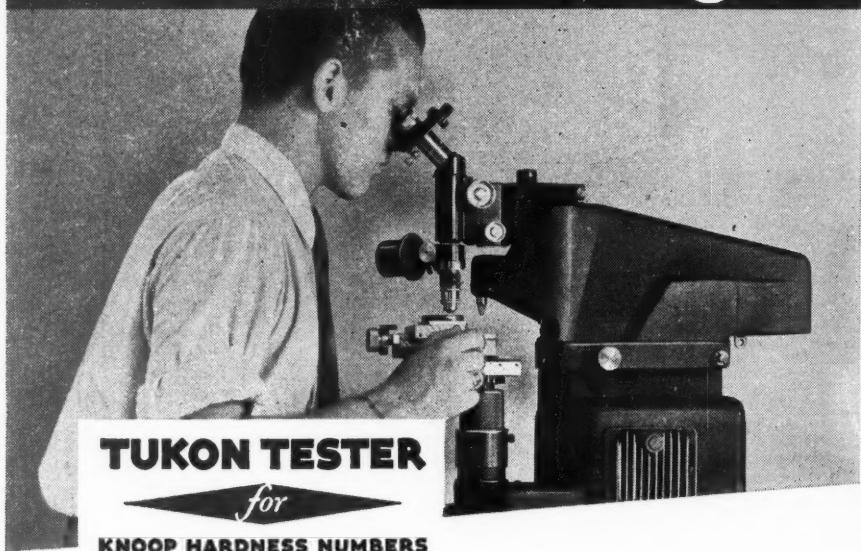
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Do you have to hold small assemblies for drilling or welding? Are you required to hold work at odd angles? Is clamping space limited? Must you exert great pressure to hold parts?

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Knu-Vise toggle-action clamping devices (only a few shown here) are recognized for their bull-dog grip and quick release, and their capability of simplifying and increasing production.

Ask us for any help you need in clamping operations. In the meantime, would you like a catalog?

KNU-VISE

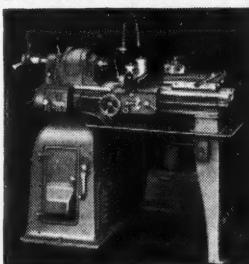
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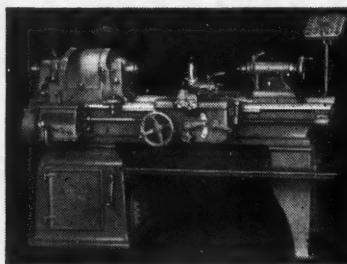
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SOUTH BEND Precision LATHES

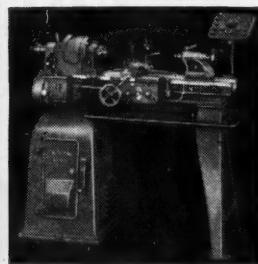
ENGINE LATHES • TOOLROOM LATHES • TURRET LATHES • ATTACHMENTS



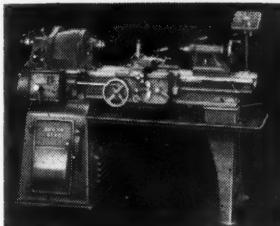
No. 1001-Z SOUTH BEND TURRET LATHE



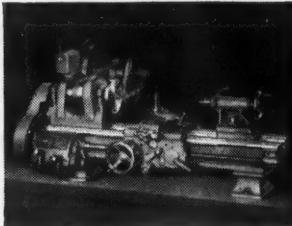
16" x 6" SOUTH BEND TOOLROOM LATHE



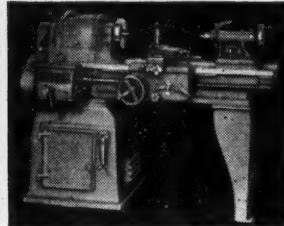
10" x 3 1/2" SOUTH BEND TOOLROOM LATHE



13" x 5" SOUTH BEND TOOLROOM LATHE



9" x 3" SOUTH BEND MODEL A BENCH LATHE



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Accurate, versatile, fast, and easy to operate, South Bend Precision Lathes simplify the handling of difficult, close tolerance jobs in all types of laboratory, toolroom, production, and maintenance work. Practical South Bend attachments and accessories increase the scope of these lathes, and speed tooling and production.

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Electric Grinding Attachment



Draw-in Collet Attachment



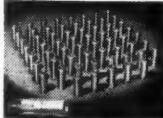
Draw-in Collet Attachment



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Double Tool Cross Slide

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EVERY REQUIREMENT

"98% More Production per Tool Grind with Talide Tools"

The chief engineer of a prominent manufacturer recently compared performance on different carbide cutting tools on a non-ferrous aircraft part. He reports . . .

"98% More production per tool grind with TALIDE"

Talide tools eliminate much of the conventional "down time" on any cutting job

—turning, boring, or facing. They keep cutting on and on and on.

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Send for Catalog 44-T
listing standard Talide
Tools and Tips.



THE ENGINEERED CARBIDE FOR ALL APPLICATIONS



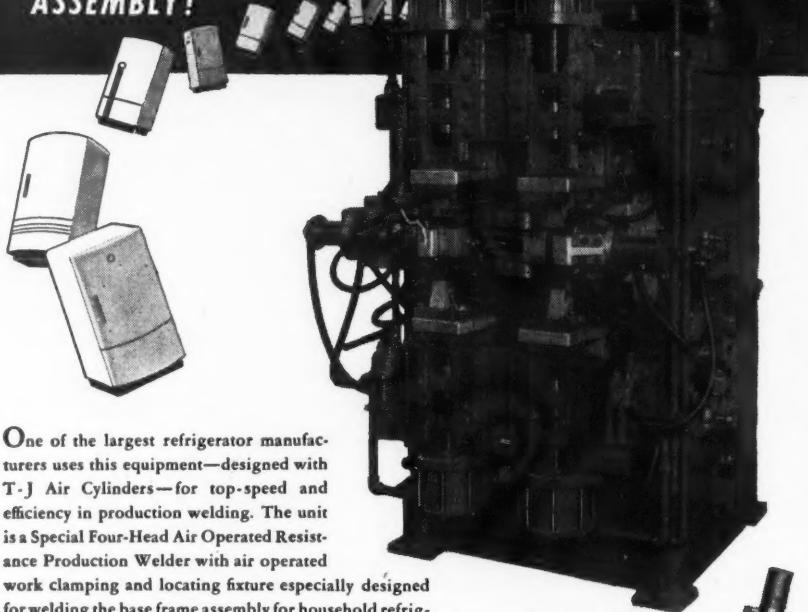
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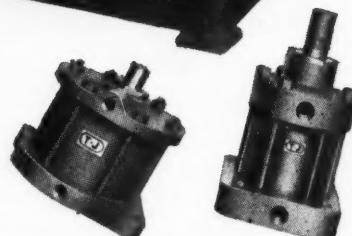
Production Welder with **T-J CYLINDERS**

SPEEDS UP REFRIGERATOR
ASSEMBLY!



One of the largest refrigerator manufacturers uses this equipment—designed with T-J Air Cylinders—for top-speed and efficiency in production welding. The unit is a Special Four-Head Air Operated Resistance Production Welder with air operated work clamping and locating fixture especially designed for welding the base frame assembly for household refrigerators. The equipment is manufactured by National Electric Welding Machines Co., Bay City, Michigan.

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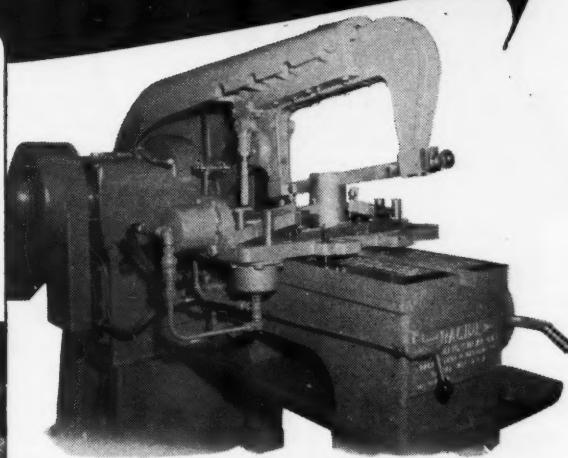
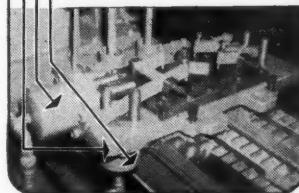
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 CUTS COSTS ON SPECIAL WORK

- 1 Special base on work holding fixture, hinged to maintain a parallel cut in work of various sizes. Slots on this job had to be held to a maximum width of .100".
- 2 Hydraulic Cylinder controls horizontal movement of vise jaw to correctly position work for slitting.
- 3 Two Hydraulic Cylinders operate pistons that actuate "finger-like" levers to hold work rigidly in cutting position.



Model 30C
 Racine Heavy Duty
 Hydraulic Machine
 10" x 10" Capacity

The pictures above, illustrate the application of a standard Racine hydraulic machine to an unusual production job. Thousands of bushings required slotting. Milling proved too slow and costly. The simple solution, a standard Racine Machine and a special, hydraulically actuated fixture, engineered and produced by Racine.

Fast, clean, accurate cutting of bars, billets, tubing, structural steel and other materials, is the everyday work of Racine Machines. Standard and specially designed or equipped models can often take over production work usually done on milling machines, turret lathes and other high priced equipment. Lower costs result.

Engineered to high precision, current Racine Machines are fast, accurate and easy to handle. For slotting, splitting, sampling, cutting-off work — for single cuts or automatic production of thousands of identical pieces, these machines provide new standards of economy.

Present your metal cutting and metal working problems to Racine engineers. Estimates and recommendations based on nearly 40 years experience will be furnished without cost or obligation. Descriptive No. 12 catalog free. Write RACINE TOOL AND MACHINE COMPANY, 1770 State Street, Racine, Wisconsin.



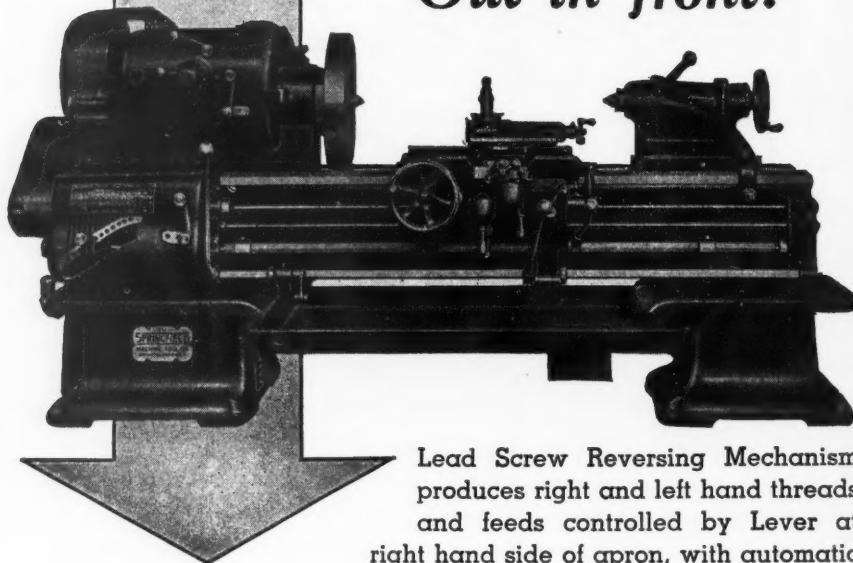
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 For power movements in your plant or for any of your products, investigate RACINE HYDRAULIC equipment. Variable Volume Hydraulic Pumps to 30 G.P.M. capacity. Pressures up to 1000 lbs. p.s.i. Also a complete line of Hydraulic Valves, $\frac{1}{8}$ " to $1\frac{1}{2}$ " I.P.S. Ask for catalog P-10-C.



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 STANDARD FOR QUALITY AND PRECISION

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Lead Screw Reversing Mechanism produces right and left hand threads and feeds controlled by Lever at right hand side of apron, with automatic stops for both Lead Screw and Feed Rod.

Lead Screws are made from high carbon steels, manufactured and tested to .001 of an inch to the foot and are only used for thread chasing, as a Feed Rod is supplied for all feeds. 36 changes of threads and feeds are obtained.

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Reduce production costs by using standard machine tools and attachments instead of expensive, single purpose equipment. It's really surprising, for example, the great variety of milling operations that can be handled by Kempsmith Standard Attachments mounted on a standard milling machine. These precision-built attachments have proven their ability to handle both accurate tool-room operations and difficult production milling jobs, reducing costs to rock bottom. Investigate the versatility of Kempsmith Standard Milling Attachments. Write today for literature.

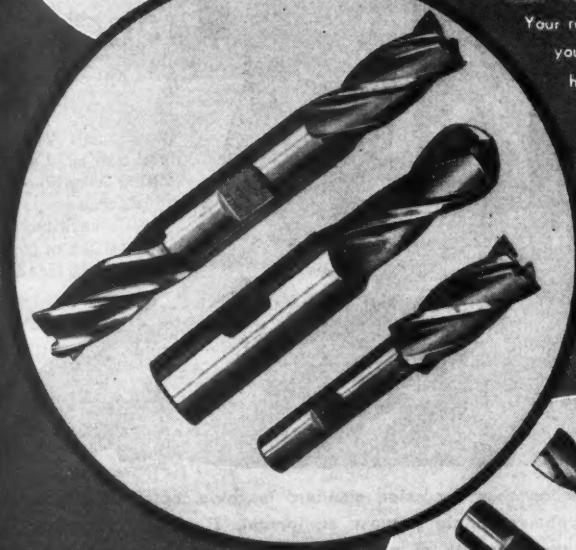
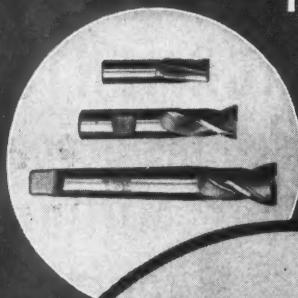
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STANDARD MILLING ATTACHMENTS

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The Right BUR for the Job

THE DOUBLE-TAPERED KELLER BUR

Shape "T"

This is a double-tapered bur with a narrow straight section. It is recommended for removing high spots and surplus stock from grooves or for breaking corners of edges on narrow grooves—note the illustrations below. Shape "T", in common with other KELLER Burrs, does a variety of work. Its versatility lends value to its effectiveness as an economical bur to have in the shop. Write for circular on other shapes and sizes of P&W KELLER Burrs.



Shape "T" is
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1½" diameter
with 60° angle.

Breaking the cor-
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a narrow groove.

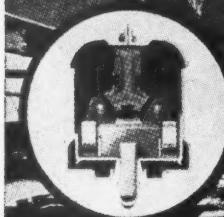
Removing high
spots and surplus
stock in a nar-
row groove.



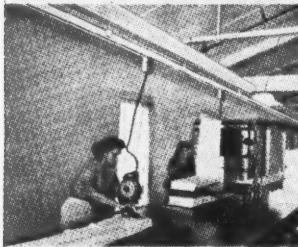
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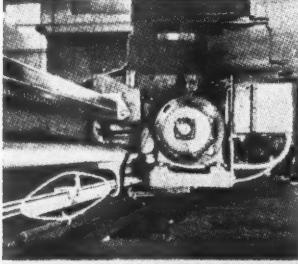
moves



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ELECTRIC FEEDRAIL *protects!*

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TEST RACKS

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ASK FOR FEEDRAIL CATALOGS GENERAL No. 15,
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14

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Subsidiary of Russell & Stoll Company

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7.6 secs.

A BRONZE REGULATING VALVE
REQUIRING 12 VARIED SECOND OPERATIONS



IS COMPLETED IN 7.6 SECONDS
ON THIS KINGSBURY FLEXIMATIC *



WE PUT OUR HEADS TOGETHER TO CUT YOUR DRILLING COSTS



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... for 12 varied SECOND OPERATIONS

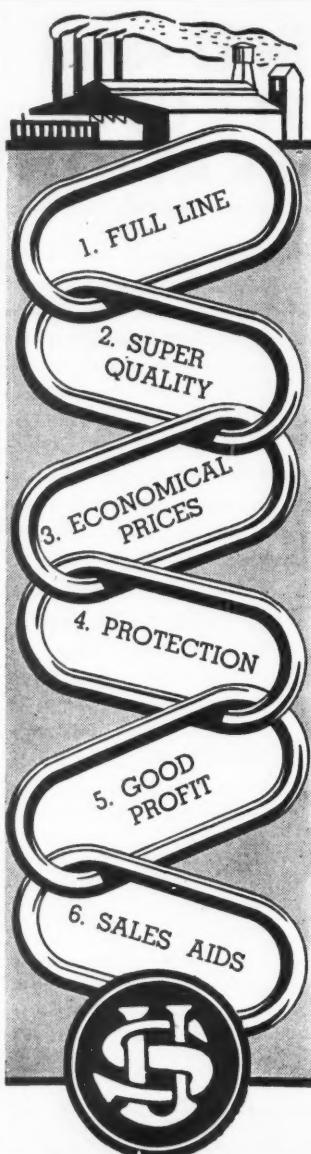
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The Fleximatic method is based on the use of standard units and modern engineering skill. Kingsbury experts study the production problem, then assemble the units in the most practical manner to produce at the most efficient rate. Such combined machining operations result in greater production and lower unit costs. And, the first cost is much lower than the usual special-purpose machine.

Do you have a production problem involving multiple machining operations? Send drawings and production data. Let our engineers suggest a profitable solution.

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— a special purpose machine for combined automatic operations during a single chucking — the result of Kingsbury engineering ability in the use of low cost standard Kingsbury drilling and tapping heads on standard Kingsbury bases.



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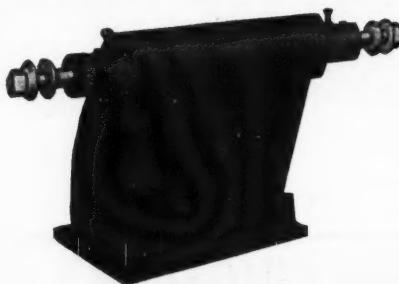
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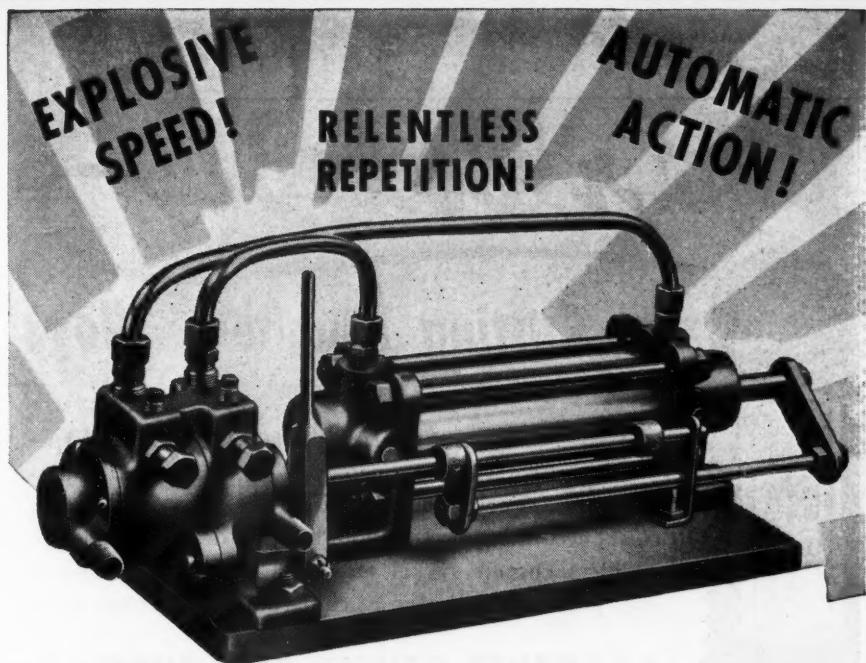
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MODEL 110

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CINCINNATI, OHIO



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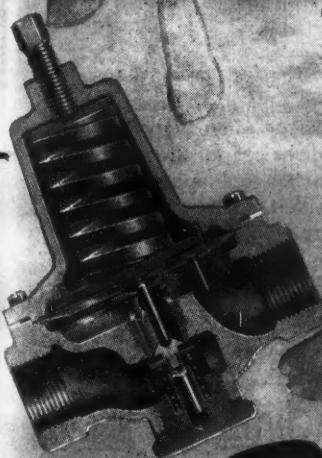
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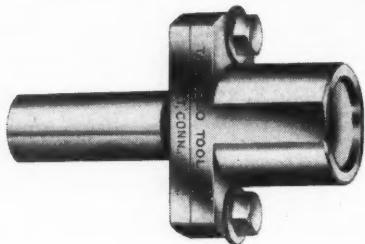
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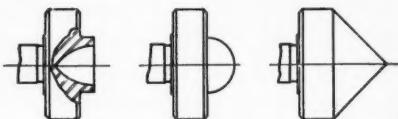


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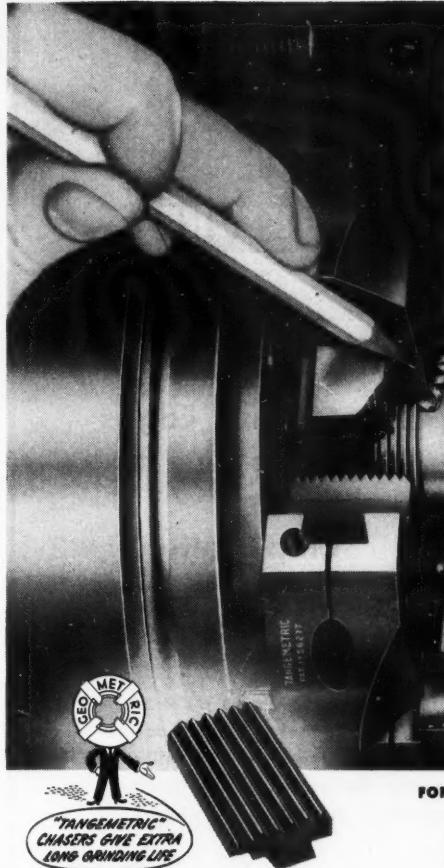


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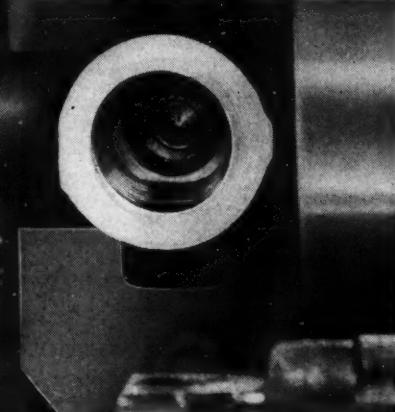
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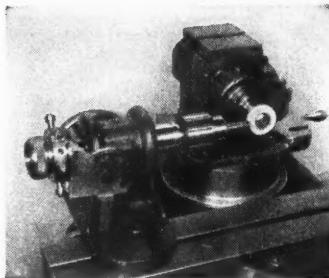
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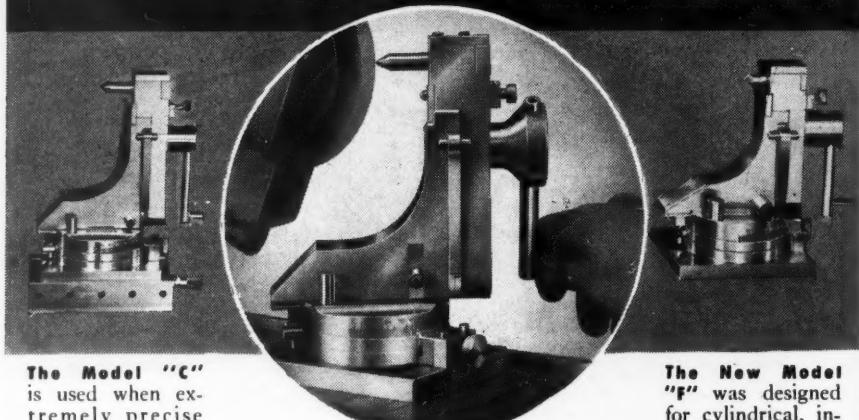
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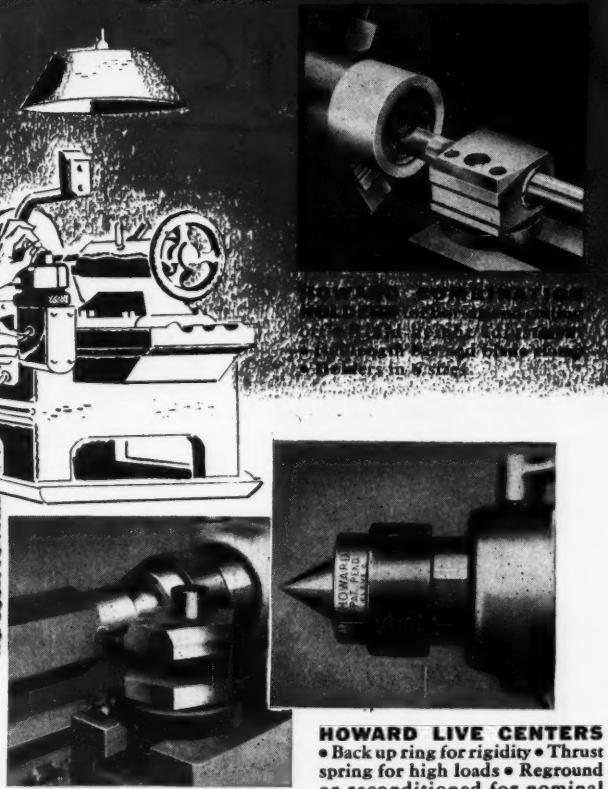
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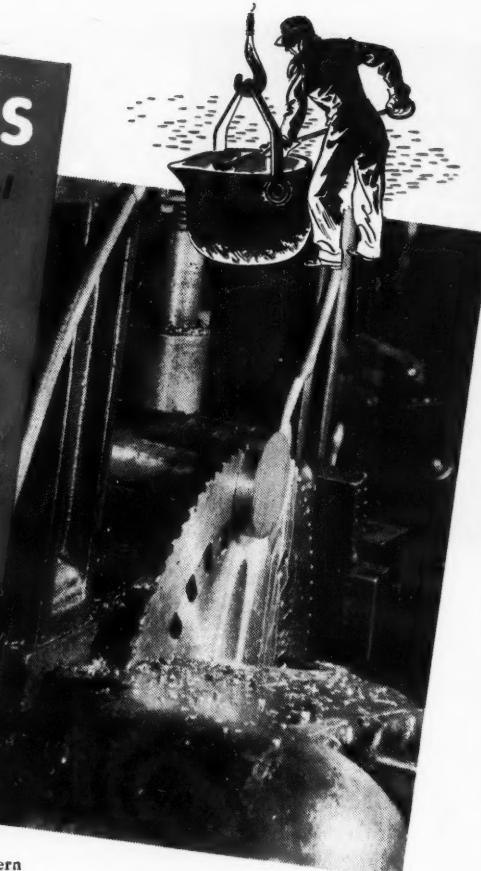
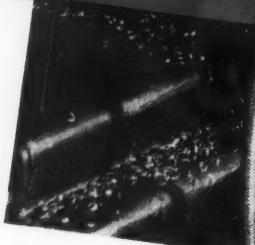
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MODERN Machine Shop

HOWARD CAMPBELL, Editor

VOLUME 19 NUMBER 5
OCTOBER, 1946

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| | |
|--|-----|
| Tooling the Automatic Screw Machines, XVII..... | 124 |
| By Noel Brindle | |
| Research on Industrial Diamonds..... | 138 |
| By John T. Roberts | |
| Cutting Costs with Modern Portable Tools..... | 164 |
| By F. B. Engeln | |
| A New Method of Gear Grinding..... | 184 |
| By T. J. Putz and H. W. Semar | |
| Black Light for Weld Inspection..... | 192 |
| By Sanford Markey | |
| Ideas from Readers | |
| —Torch-Annealing on the Job, by V. H. Laughner.. | 200 |
| —Dowel Pin Puller | 205 |
| —Speeding-Up a Power Press, by Robert Mawson.. | 206 |
| —Sheet Metal Crimping Tool..... | 208 |
| —Checking Length and Skew, by W. L. Montooth.. | 212 |
| News of the Industry..... | 218 |
| New Shop Equipment..... | 220 |
| Services Directory | 388 |
| —"Where to Get It"..... | 392 |
| Cartoon | 396 |
| Over the Editor's Desk..... | 398 |
| A.S.T.E. Semi-Annual National Convention..... | 399 |
| Index to Advertisements..... | 401 |

ARMSTRONG TOOL HOLDERS



ARMSTRONG TOOL HOLDERS are known for their great strength—their ability to stand up to the heaviest cuts on the largest machine tools. However, it's on the delicate jobs like the one illustrated here where a $1\frac{1}{8}$ " shaft is turned from ".187" to ".109" diameter with "Tolerance: *None*" that their superiority of design is manifest.

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Photographs courtesy R. K. LeBlond, Machine Tool Co.

Part: Small Die Shaft

Operation: Reduce diameter of Kinite steel shaft from ".187" to ".109"

Length: $1\frac{3}{8}$ "

Finished Diameter: ".109"

Tolerance: NONE

Machine Tool: 13" LeBlond Regal Lathe

Cutting Tool: ARMSTRONG Left Hand Off-Set TURNING TOOL with square high speed steel cutter-bit.

Place: Photographs taken at American Lava Corporation, Chattanooga, Tenn. NOTE: At this plant, even smaller shafts, down to ".010" diameter are frequently and regularly machined with the same set-up illustrated.

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MODERN Machine Shop

OCTOBER, 1946

VOL. 19, NO. 5

CINCINNATI, OHIO

This Month

This month's feature article is the seventeenth in Noel Brindle's series "Tooling the Automatic Screw Machine." In this article Mr. Brindle discusses "second-operation" tools and methods and proceeds to show how second operations can in many instances be performed on the automatic cheaper than they can be performed by hand in other types of machines. The subject is a little too large for one article, however, and it will be continued in next month's issue.

Buyers and users of industrial diamonds will find some interesting and useful data in John T. Roberts' report titled "Research on Industrial Diamonds" which will be found on page 138. Crane Company engineers spent a lot of time and hard work on the business of finding out just which kinds and types of industrial diamonds were best suited for wheel dressing, and we consider that we are very fortunate indeed in being selected by these engineers and the Crane Company to present this report to the industry.

"Cutting Costs with Modern Portable Tools" written by F. B. Engeln, vice president of Rotor Tool Company, and presented on page 164 of this issue, contains a lot of very useful information regarding the uses of portable tools for cutting costs in the shop and data concerning the maintenance of those tools. There is a lot of good information here for the methods engineer.

Gear design and manufacture is always an interesting subject, so we are pleased indeed to be able to present a short description of the methods employed in the Westinghouse South Philadelphia plant for grinding large gears for turbine locomotives. Page 184.

"Black light," which was regarded as a highly interesting but more or less useless gadget just a few years ago has now become a practical inspection tool in the machine shop. In the article "Black Light for Weld Inspection," which begins on page 192, Sanford Markey tells how black light is used to detect minute defects in welds in aircraft heaters that are made by the Surface Combustion Corporation of Toledo, Ohio. There ought to be some good suggestions in this article for the manufacturers of other, similar products.

The "Ideas from Readers" section contains the usual assortment of interesting and useful developments for performing various types of operations.

Don't forget to make reservations for the Semi-Annual National Convention of the American Society of Tool Engineers which is to be held in Pittsburgh, Pennsylvania, October 10, 11 and 12.

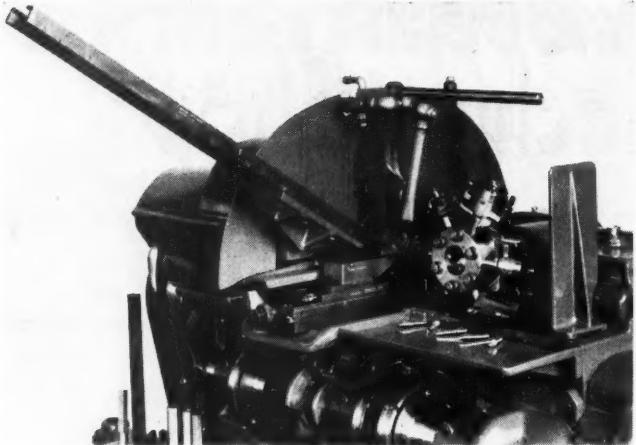


Fig. 1 — Chute-Type Magazine Attachment for Second-Operation Work, Mounted on a B & S Automatic Screw Machine

By
NOEL BRINDLE

Tooling the Automatic Screw Machine, XVII

In this article the author discusses second operations on screw machines, including methods, tools, and the use of magazine attachments.

THE fully automatic screw machine is undoubtedly one of the most highly developed mass production facilities, having in-built characteristics of flexibility and adaptability for the machining of a large variety of components. However, this usefulness has been extended by the manufacturers of the machines through the development of a wide range of attachments which can be applied to the machines to make possible the completion of special operations that cannot be performed with the standard tools.

In many cases the use of a special attachment will make it possible to complete all the machining requirements in the first operation. A good

example of such a tool is the Brown & Sharpe slotting, burring, index drilling and cross drilling attachment. However, the component may be of such design that it will be impossible to complete all the machining operations in the first set-up even though the standard attachments are available. When this condition prevails, a secondary operation should be provided.

Although the great majority of screw machine products are produced complete in single operations, the automatic screw machine has a wide range of usefulness on second-operation work. The machine offers a tremendous advantage in the production

of more complex parts, machined to close dimensions at low cost and with advantageous labor factors. Often one operator can readily manage three or more machines on secondary operations simultaneously, with a minimum amount of fatigue.

Some of the more common of the second operations are performed at the "cut-off" end of the workpiece. These include centering, drilling, tapping, threading, facing and other similar operations which are either difficult or impossible to perform in the first operation.

When requirements are small, customary procedure indicates the use of a hand screw machine to perform the second operation. However, it is usually advantageous to utilize an automatic screw machine for second operations even on small lots, and it will be found that tooling requirements can be met with a minimum of expenditure.

When this method is used, it is usual for an operator to load the component into a special tool held in the turret of an automatic screw machine. The turret is then indexed until the component is in line with the work spindle, at which point the turret advances until the part has been inserted into a spring chuck. The chuck then closes and the machining operations follow. A spring-activated plunger lo-

cated inside the collet will provide the necessary movement to eject the workpiece when the operation has been completed and the chuck is opened.

In the method outlined above, the services of an operator are necessary only when the loading tool is in one of the upper positions of the turret. When circumstances warrant, two automatics may be located adjacent to each other with an operator stationed between them. This procedure is particularly desirable on fast jobs when the time cycle per part requires the full time of one operator to load the two machines.

When the requirements are large, the conventional means of increasing the efficiency of the automatic screw machine is through the use of a specially-designed magazine attachment. This attachment, mounted on an automatic screw machine of Brown & Sharpe or similar design, will frequently reduce the amount of attention required to such a point that the ma-

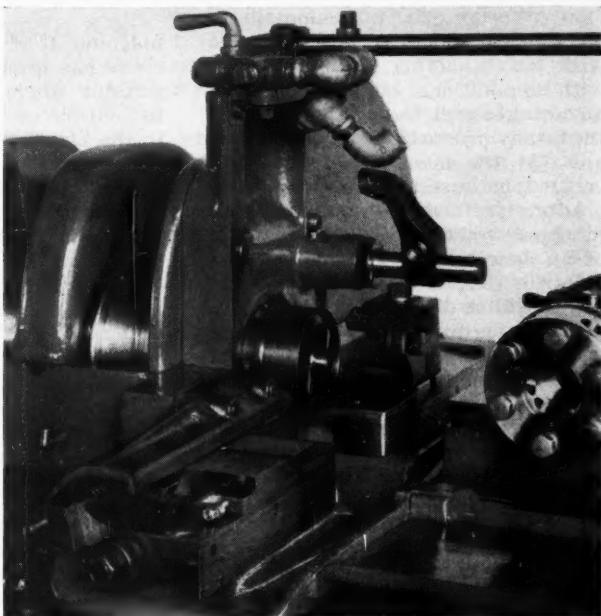
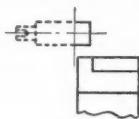


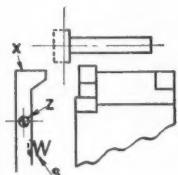
Fig. 2—Double-Movement Cross Slide, Used to Provide Increased Latitude of Movement Between Work Spindle and Magazine Attachment

**MOVEMENTS REQUIRED TO INSERT
COMPONENT INTO CHUCK**



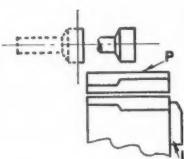
A

CARRIER ADVANCES TO WORK SPIN-
DLE POSITION. INSERTING TOOL
PUSHES PART INTO CHUCK. INSERT-
TOOL DROPS BACK. CARRIER DROPS
BACK.



B

CARRIER ADVANCES TO WORK SPIN-
DLE POSITION. INSERTING TOOL
PUSHES PART INTO CHUCK. INSERT-
ING TOOL DROPS BACK. CARRIER
DROPS BACK AND LATCH "X," PIVOT-
ING AT "Z," WITHDRAWS UNDER
COMPONENT.



C

CARRIER ADVANCES TO WORK SPIN-
DLE POSITION. INSERTING TOOL
PUSHES PART PARTIALLY INTO
CHUCK AND CONTACTS TRIP LEVER
"L" WHICH ALLOWS END PLATE "P"
TO DROP BACK. INSERTING TOOL
DWELLS WHILE CARRIER DROPS
BACK. INSERTING TOOL CONTINUES
TO PUSH PART INTO CHUCK FOR
REMAINDER OF DISTANCE REQUIRED.

**Fig. 3 — Drawing Il-
lustrating Types of
Carriers Used in Con-
junction with Chute-
Type Magazine At-
tachments Mounted
on B & S Automatic
Screw Machines**

as the chute, trough, rotary and hopper magazine attachments. Each is designed for a specific task, and each offers certain advantages.

**Chute-Type
Magazine
Attachment**

Figure 1 shows a chute-type magazine attachment mounted on a Brown & Sharpe automatic screw

chine can be operated simultaneously with several other automatics and with no additional labor. Two definite advantages will then be gained: (1) the hourly production will be increased and (2) the labor cost will be decreased, because the same cutting operations performed in a hand screw machine would engage the attention of an operator.

Various types of magazine attachments will be discussed in this article, and photographs will be included showing the magazines mounted in position on the machines. Several diagrams will also be presented to aid the screw machine engineer to familiarize himself with the information required when a second operation in the automatic is under consideration.

For second operations in the Brown & Sharpe automatic screw machine, four types of magazine attachments are commonly used. These are known

machine. It will be noted that a long chute has been provided, located at a suitable angle (usually 30 degrees) to hold the components and feed them to the chuck by force of gravity. The chute is attached to a bracket that is mounted on the frame of the machine. Finished pads, each with three tapped holes, are provided on the frames of all Brown & Sharpe automatics for this purpose. The screw-slotted, burring and similar types of standard attachments are mounted on this pad, which may also be utilized for the chute-type magazine attachment.

It will be noted that a rectangular block, known as a "carrier," is mounted on the front cross slide. The carrier is provided with a groove designed to suit the shape of the component. The regular front cross slide is removed when a magazine attachment is to be used and a double-movement cross slide, shown mounted in place on the

machine in Fig. 2, is used instead.

The special cross slide provides for wider latitude of movement between the work spindle and the attachment. This increase in range of movement is necessary because the attachment is located at a point far enough from the work spindle to allow clearance for the turret tools, and the carrier must be provided with mechanical feed to move it from the magazine attachment to the work spindle.

The double movement cross slide actually consists of two slides, one mounted on the other, with the carrier located on the upper slide. The lower slide carries a pinion which meshes with a pair of parallel racks. One rack is attached to the machine and the other is integral with the upper slide. The disc cam, which is mounted on the front shaft of the machine, advances the lower slide towards the work spindle. At the same time the pinion causes the upper slide, carrying the carrier, to move twice the distance advanced by the lower slide.

In Fig. 1 the carrier is shown in its rear position, where a component can drop into the groove provided in the block. A rise on the front slide cam provides means for the carrier to advance towards the work spindle and immediately a special inserting tool, mounted in the turret, advances the component into the opened chuck. Inside the chuck a spring-activated plunger is provided which will push the component back against the inserting tool, thus ensuring that all components will be located in the same position inside the chuck.

After the part has been inserted, the chuck closes automatically and the inserting tool is withdrawn by the action of the turret. When the inserting tool has dropped back sufficiently, the carrier recedes to its loading position. While the carrier is inserting the work-piece in the spindle and withdrawing, the next component in the chute is

prevented from feeding down by the top face of the carrier, as shown in Fig. 1.

When the inserting tool has been withdrawn from the groove in the carrier, the machining operations proceed. Upon the completion of the operations, the spring chuck is opened and the component is ejected by the spring plunger, as described previously.

The drawing Fig. 3 illustrates three types of carriers, all of which may be used in conjunction with the chute-type magazine. Each design presents special features which will be discussed below.

The most simple design of the three types shown is illustrated at "A". This carrier is used when the component to be transferred from the magazine attachment possesses the necessary proportions to prevent the part from tilting. If tilting should occur, the part could not satisfactorily be inserted into the chuck. For a component which requires no forming or turning on the stock diameter, or with forming or turning required for a short distance only, this type of carrier would be suitable.

When the carrier "A" is used in conjunction with the chute-type magazine, the carrier advances the work-piece to the work spindle position and the inserting tool, which is held in the turret, pushes the piece into the open chuck. The chuck is then closed, followed by the dropping back of the inserting tool. After the inserting tool has completely withdrawn from the carrier, the carrier itself can be allowed to return to its rear position.

The carrier "B" is used when the component is to be inserted into the chuck for only a short distance. It may be noted from the illustration that even though the shape of the part would permit it to tilt downward, it is prevented from tilting by the design of the carrier.

Carrier "B" is similar in design to

carrier "A" with the exception of a latch that is pivoted to the left side of the carrier. While the component is in the carrier, the small diameter is at the right end and the large diameter is located in the counterbore in the left side of the carrier, where it is held by the tapered edge of the latch.

The movements required to insert the component into the chuck when using the method indicated at "B" are identical with the method previously described until the part has been inserted into the chuck. Following the closing of the chuck, however, the inserting tool drops back a short distance, after which the carrier also recedes from the machine spindle.

During this movement the latch X, pivoted at Z, withdraws under the component. When the carrier has completely withdrawn, the spring "S" forces the latch "X" upward until it is stopped by an adjustable setscrew. At this point the latch is in a vertical position, which ensures that the next component will be held securely on both its large and small diameters while it is being transported from the magazine to the work spindle.

When it is necessary to transport to the work spindle and insert into the chuck, for its full length, a component which will probably tilt downward if the carrier "A" is used, the carrier indicated at "C" may be considered.

It will be noted that the body of carrier "C" is provided with both a small and a large groove, to suit the two diameters of the component. The end plate "P", which is hinged to the carrier, has a profile machined in it, as shown, to provide support for the part on both diameters. When the inserting tool comes into contact with the trip lever "L", the end plate drops down and the carrier may be withdrawn. When the front cross slide recedes, a pin located on the end plate "P" comes into contact with the front portion of the lower slide, providing a method whereby the end plate is raised

to a vertical position as shown at "C" in preparation for the next component.

The sequence of movements when carrier "C" is used is as follows: When the part has dropped from the magazine into the carrier, the double-movement cross slide advances to work spindle position. The inserting tool, which is held in the turret, pushes the component a short way into the chuck, or until the component reaches the position shown at "C", where the large diameter of the part is just a little way short of contact with the end of the small opening in the carrier. At this moment the inserting tool bears on trip lever "L", causing the end plate "P" to drop backward. During this sequence the component has been held firmly between the spring ejector in the chuck and the inserting tool.

After the carrier has dropped back far enough, the inserting tool proceeds to push the part fully into the chuck. The machining operations then follow. The end plate "P" will be brought back to the position shown at "C" as mentioned previously and the trip lever "L" will hold it securely in vertical position until lever "L" is again tripped by the inserting tool.

Trough-Type Magazine Attachment

When second operations are required on the cut-off ends of components that vary in length but have the same diameter, a trough-style magazine may be useful. The photograph Fig. 4 shows such a magazine, mounted on a B & S automatic screw machine. The magazine is of box-type construction and is mounted on a base which, in turn, is bolted to a pad provided on the machine for this purpose.

To prepare for automatic operation the magazine is filled with workpieces, which feed to the carrier through an opening at the bottom. When the front cross slide, carrying the carrier, withdraws to its rear position, the groove in the carrier is positioned directly under the opening in the magazine.

Fig. 4—The trough-type magazine mounted on this machine is used when components vary in length.

One component drops into the carrier groove, the remaining pieces being held in the magazine. As the carrier moves forward to work spindle position, the top face of the carrier prevents the other parts from leaving the magazine.

After the carrier has moved the component into line with the work spindle, the inserting tool, visible in Fig. 4 and 5, pushes the part into the chuck. The chuck is then closed and the inserting tool withdraws. When this tool has receded sufficiently, the front cross slide returns to its rear position and another part drops into the carrier.

Referring to Fig. 5; it will be noted that a partition has been provided inside the magazine. The partition can be adjusted sidewise to accommodate parts of various lengths, thus ensuring that when it is transported in the carrier, the left end of the component will always be within the required distance of the front of the chuck nut on the work spindle. The movements required for the inserting tool will, therefore, be reduced to a minimum.

When small-diameter parts are loaded into an attachment of this type, it is sometimes found that they will wedge at the bottom of the attachment, thus preventing further pieces from leaving the magazine. If this



condition should arise, the bottom plate inside the magazine should be made to pivot from a fulcrum point at the rear of the attachment. Near the front end of the plate, on the bottom side, a V-shaped projection is provided which fits into a V-shaped groove in the carrier. A series of rises and drops on the front cross slide cam causes the carrier on the cross slide to move forward and backward and the bottom plate on the attachment to agitate up and down. This device has a tendency to keep the components in motion so that they will gravitate toward the opening in the bottom of the magazine.

Rotary-Type Magazine Attachment

The rotary-type magazine attachment is used when the size and shape of the components will not permit the use of a chute-type gravity-feed magazine. The component with a consider-

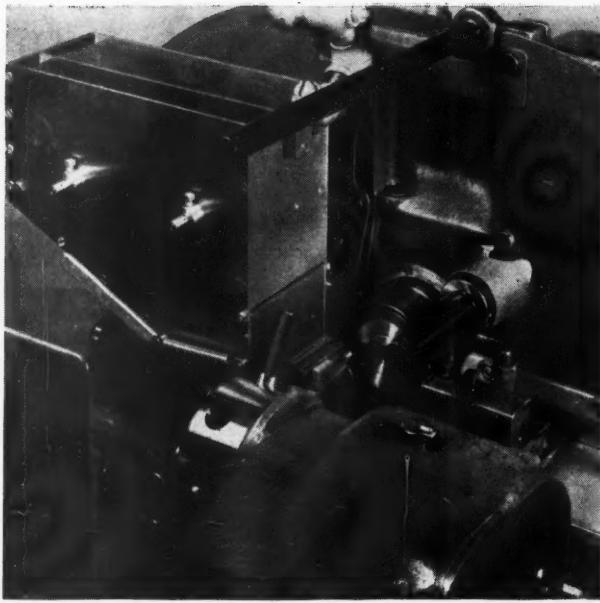


Fig. 5.—The partition in the magazine can be adjusted sidewise to accommodate parts of various lengths, ensuring that the part will be delivered within the required distance from the chuck nut on the spindle.

able variation between the sizes of the stock diameter and the turned diameter falls into this class, and usually such work necessitates the use of a magazine of the rotary type.

A rotary-type magazine attachment is shown set up on a machine in Fig. 6. It will be noted that the components are positioned in grooves in the face of a wheel which rotates in a clockwise direction on the inside of a large drum. The drum serves as a retainer for the components. At the point in the drum which is nearest to the machine spindle, an opening allows the components to drop into a short chute which is mounted directly above the carrier.

In the photograph, the carrier, which is mounted on a double-movement cross slide, is shown in its forward position at the work spindle. After the part has been inserted and the chuck has closed, the cross slide withdraws to its rear position. During this movement a ratchet and pawl arrangement

low the opening in the chute, the part will fall into the carrier, ready for the next forward movement to the work spindle.

Hopper-Type Magazine Attachment

When a magazine attachment is required for small components of such design that either end of the piece may be inserted into the chuck, a magazine of the hopper type frequently serves the purpose. However, the design of the part should be such that it will not tilt downward while it is being inserted into the chuck.

The hopper has one sloping side, and as the pieces are dropped in they gravitate towards a bar which is constantly oscillating in a vertical plane. This movement causes the parts to be thrown towards a chute that leads to the bottom of the magazine. Any parts that are not accurately located in the chute are thrown backward into the hopper by a wheel located at the top of the chute, thus ensuring that the

parts in the chute will be in correct position. Parts not correctly positioned will be ejected to the rear of the hopper.

The components illustrated in the drawing Fig. 7 are typical of the types that would necessitate the use of the four magazine attachments discussed in this article. It will be noted that the shape of the part determines, to a large extent, the type of magazine attachment required.

As mentioned previously, finished pads are provided on all Brown & Sharpe automatics—and probably on other makes of automatic screw machines as well—for the purpose of mounting various kinds of attachments. Tapped holes are also provided in the pads to match drilled holes in the attachments. The sizes and locations of these holes, as provided in Brown & Sharpe automatics, are given in the table in the drawing Fig. 8.

When it is necessary to feed stock in a B & S automatic screw machine, the chuck and feed cam, which is located at the side of the machine, makes one complete revolution. While this is taking place the chuck opens, the feed tube advances, the chuck closes and the feed tube withdraws. All of these movements take place when the chuck trip lever at the front of the machine is automatically raised.

For a second operation it is neces-

sary to provide means whereby the chuck will remain open when the feeding mechanism is in use, to allow the component to be inserted. It will be necessary to lift the chuck trip lever again to close the chuck.

To obtain this same performance on the Brown & Sharpe No. 00 and No. 0 automatics, a special chuck clutch is mounted on the back shaft. This clutch is provided with two cam pockets, whereas only one pocket is required for the standard clutch. The special clutch is disengaged at each half cycle of the chuck and feed cam; thus it is necessary to start the feeding mechanism a second time in order to close the chuck. A piece made to fit one of the pockets is furnished with the special clutch for use when the machine is to be used for first operation work; it will then be possible for the chuck clutch to make one complete revolution before being disengaged.

The chuck clutch on the No. 2 size of machine makes two revolutions to

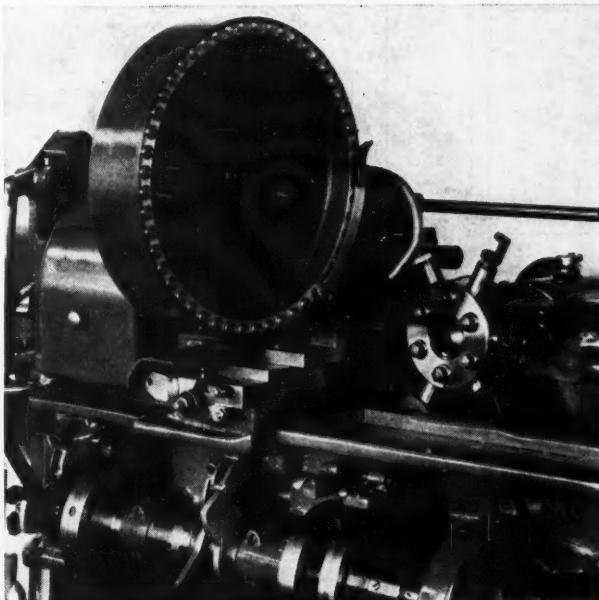
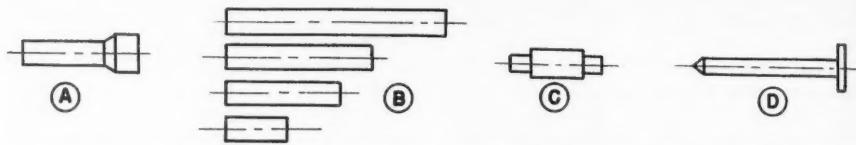


Fig. 6—Automatic Screw Machine Equipped with Rotary-Type Magazine



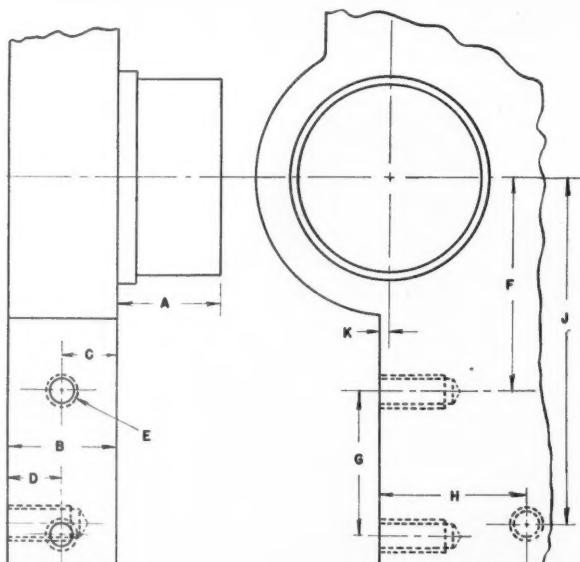
A—CHUTE STYLE. For irregular-shaped components, the design of which will allow the parts to roll down freely without binding. **B—THROUGH STYLE.** Adjustable for different lengths of parts. Usually used for long components. **C—HOPPER STYLE.** For small components of such design that either end can enter chuck. Length of chucking end should be sufficient to prevent part from tilting while being inserted into spring chuck. **D—ROTARY STYLE.** For irregular-shaped components the design of which will not allow the part to roll down into a chute without binding.

Fig. 7—Drawing Illustrating Types of Components and Indicating Type of Magazine Attachment Best Suited to Each

provide the movements of opening the chuck, feeding the stock, closing the chuck and withdrawing the feed tube. Therefore, to prepare the No. 2 ma-

chine for second operations, a simple adjustment is made inside the machine which disengages the chuck clutch after one revolution has been made. It may be necessary to make other minor adjustments on some of the older types of automatics when second operations are to be performed. However, the more important changes that may be required have been covered above.

A typical design for a carrier which may be used with any of the four types of magazine attachments presented in this article is illustrated in Fig. 9. The dimensions are those



| MACHINE | A | B | C | D | E | F | G | H | J | K |
|---------|--------|------|-------|-------|------------|-------|-------|-------|--------|-----|
| 00 | 15/16 | 13/8 | 9/16 | 1/2 | 3/8-16 | 25/8 | 15/16 | 17/8 | 4 1/4 | 1/8 |
| 0 | 1 3/4 | 13/8 | 13/16 | 13/16 | 1/16-14 | 3 1/4 | 2 1/4 | 2 | 5 7/16 | 1/8 |
| 2 | 2 5/16 | 1 | 7/16 | 9/16 | 1/2-13 4/5 | 1 1/4 | 2 1/4 | 5 3/8 | 3 3/8 | 1/8 |

Fig. 8 — Table of Sizes and Locations of Holes in Pads Provided on B & S Automatics for Attachments

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which are required when the carrier is to be used in conjunction with a double-movement cross slide for the B & S No. 00 size of automatic screw machine.

Conclusion

An attempt has been made in this article to acquaint the reader with some of the more popular types of magazine attachments. A screw machine engineer may find that his own

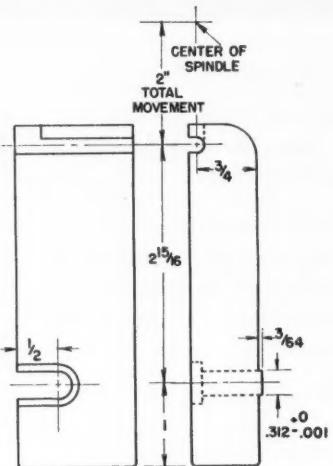


Fig. 9—Drawing of Carrier for Use on Double-Movement Cross Slide for B. & S. No. 00G Automatic Screw Machine, Giving Dimensions

tooling problem requires a design embodying certain features not included in this article. However, the discussion should stimulate activity leading to the use of the automatic screw machine for second-operation work, with a consequent increase in production, greater accuracy and improved efficiency.

This article is the first of two on the subject of magazine attachments. The second article will present several examples that will emphasize the advantages available through the use of the automatic screw machine on second-operation work.

"Human Relations Prime Management Responsibility"

An opinion by management leaders in virtually all classes of industry that "business must subordinate all else in the selection of executives to the element of human understanding" is expressed in the annual report of the American Management Association for 1945-1946, released September 10th.

The report is a consolidation of views from a cross-section survey of executives in widely varying capacities in all types of industry. Qualified by long experience and practical accomplishment, those queried were in the main directors, vice presidents and planning council members who guide activities of the 10,000 members of AMA's industrial relations, production, finance, insurance, marketing, and office management divisions.

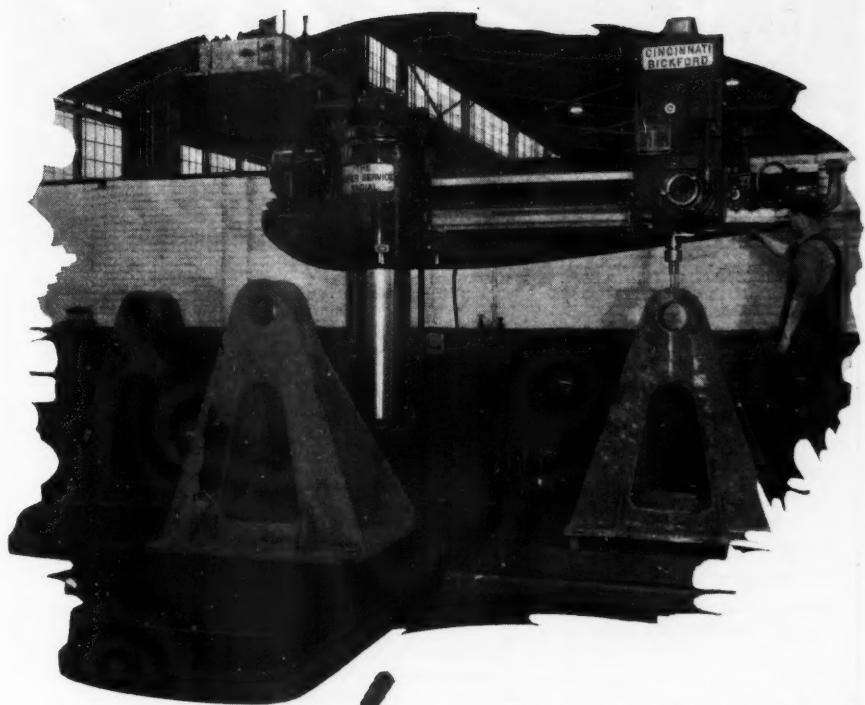
In a foreword to the report, Alvin E. Dodd, AMA president, pointed out that "the manager is a person of first importance to some forty odd million Americans who spend most of their daily lives in the office or in the factory. Decisions of the manager—foreman, department head, or company president—have a far more intimate effect on the lives of the average working citizens than do the deliberations of our Congress or state legislatures."

Included in the report is a checklist for evaluating the qualifications and performance of business management and executives in understanding and guiding the individuals and groups that comprise the nation's industrial organizations.

In discussing personal characteristics of executives, the report states that a talent to direct associates in a way that will instill enthusiasm and self-respect is required.

Continuing counsel of employees, a sound sense of values which enables the manager to align his company's objectives with social objectives in general, the proper combination of intelligence, attitude, emotions and sensitivity to people and environment are discussed as necessary factors. Decisiveness, judgment, tolerance and the ability to recognize and implement others' ideas are also enumerated and defined.

The report also lists as important "the fundamental necessity of maintaining two-way communications between employees and management to minimize difficulties and misconceptions, to remove fear, doubt and suspicion from the minds of workers and replace this destructive thinking with constructive understanding."



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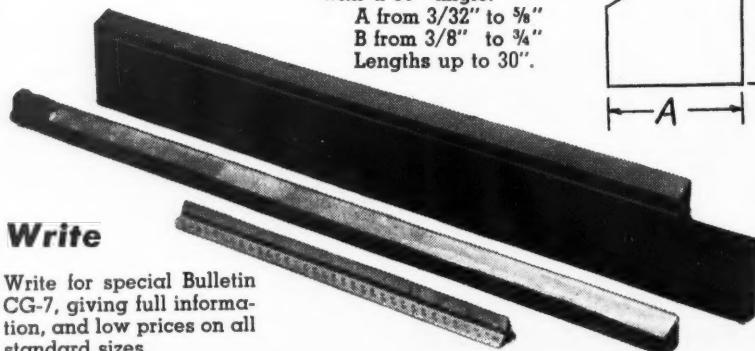
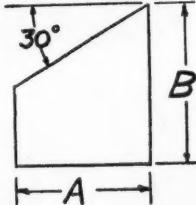
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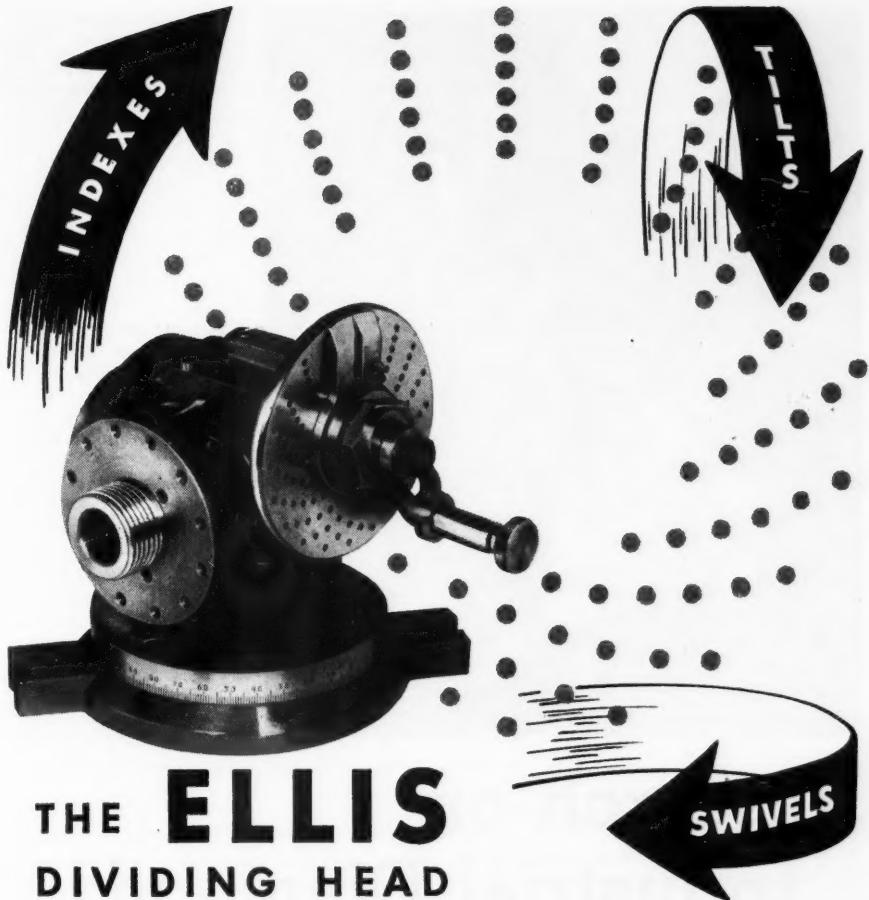
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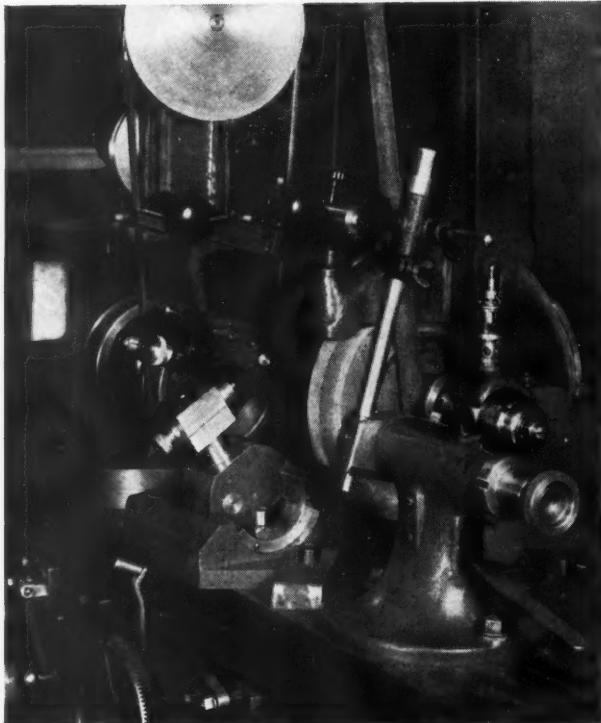


Fig. 1—Equipment used in making tests on industrial diamonds, consisting of a Brown & Sharpe No. 2 grinder upon which was mounted a special diamond dressing tool holder.

This article comprises a tabulation of the results of a study made by the Crane Company's Research and Development Laboratories, during the war, on the various types of industrial diamonds used for wheel dressing.

Research on Industrial Diamonds

By JOHN T. ROBERTS
Research Engineer, Crane Company

ABOUT 50 per cent or more of the world's diamond production, being unfit for gem purposes, are used in industry. They go into the manufacture of mining tools, tools for truing or dressing wheels, and for shaping, turning and boring metallic or plastic machine parts or other products. Some of these so-called industrial diamonds are transparent and "flawless" like their

blood brothers, the gems; some are translucent, contain small amounts of impurities, and are pale yellow, pink or brown in color while others are opaque, contain large amounts of impurities and are green, grey, or black in color.

At the beginning of the war, a shortage of the almost flawless or better grade of industrial stones appeared to

be imminent. To those engaged in the production and use of grinding-wheel dresser tools, into which most of these high-grade stones are diverted, such an impending shortage could mean only one thing—substitution; substitution of some of the more plentiful, less perfect stones. Immediately the question arose as to whether these less perfect stones would prove to be as durable.

In 1942, at the recommendation of the War Production Board, the War Metallurgy Committee of the National Academy of Sciences, National Research Council, sponsored a project to find the answer to the above-mentioned question. The project was set up at the Research & Development Laboratories, Crane Co.

In this article* attempts shall be made to show briefly how this investigation was carried out and the results that were obtained; (1) how attempts were made to gather together for test a representative supply of the preferred varieties as well as the less perfect more plentiful types of stones, (2) how the stones were tested for durability and that some of the less perfect varieties appeared to be as durable as the types which are preferred; (3) how a classification system was developed to enable the reader to select for himself the types of stones which appeared to be the most durable, and finally, (4) how the durability of all stones appear to be related to their shape, tool positioning and uniformity of structure.

Selection of Diamonds

Attempts were made to select for durability tests a sufficient number of stones of every grade or type that might be of use in the production of wheel dresser tools. For the sake of discussion we shall divide the stones selected into three general groups:

- (1) transparent or flawless type

* For detailed reports on this subject see list of references at the end of this article.

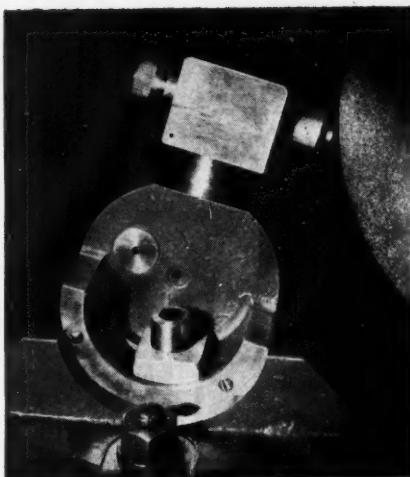


Fig. 2 — Close-up view of special diamond dressing tool holder used in making tests on diamonds.

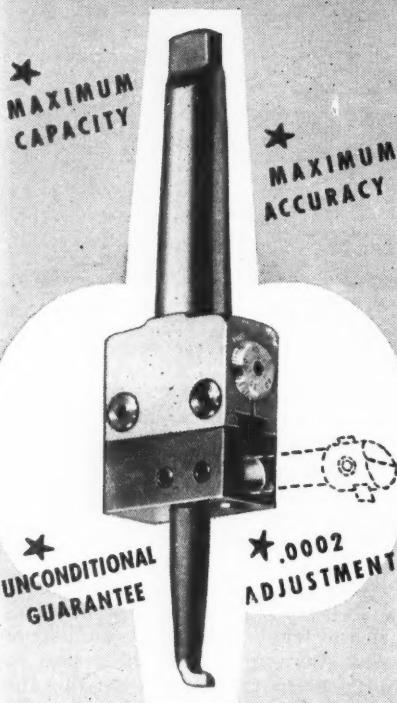
stones like those that are preferred by the trade;

- (2) transparent to translucent stones;
- (3) translucent to opaque varieties or coated stones.

Of interest may be the source and quantity of supply. The transparent or preferred types of stones, 54 in number were selected from 6 of 32 categories in what is called an Industrial Series Assortment, which is one of the six assortments distributed by the Diamond Trading Co. of London. By name these six categories are known as 1st grey rounds, 1st brown rounds, 1st yellow shapes, 1st grey shapes, 1st brown shapes, and 2nd yellow rounds.

The transparent to translucent stones, 80 in number, were also selected from the Industrial Series, 9 additional categories being represented; as follows: 1st colored rounds, 1st grey brown rounds, 2nd colored rounds, 2nd grey brown rounds, 2nd river rounds, common grey colored rounds, dark brown rounds, darkest brown rounds, and 2nd grey shapes.

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Fig. 3—Diamond Type No. 1; Class 7D.3. Transparent-to-Translucent Distorted Octahedron-Dodecahedron Cube

A 5000-carat parcel of what is called Crushing Bort (also distributed by the D. T. C. Co. of London) completed our supply. This parcel contained an assortment of the translucent-to-opaque stones known to the trade as coated stones and cleavages, black and colored bort stones, and black rejections.

Wear Rate Tests and Results

A number of stones in each of the general groups mentioned above were

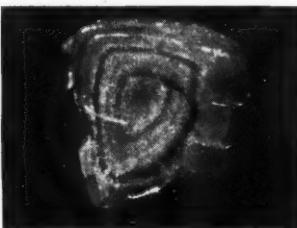


Fig. 4—Type 2; Class 12.7. Opaque Cube

selected and mounted in tools. These tools were set up in a Brown and Sharpe No. 2 Grinder and under controlled conditions (feed 0.001 inch, traverse speed and angle 0.015 inch/rev. and 0 deg.; wheel speed 5000 s.f.m.; drag angle 15 deg.; type of wheel 60 MBE Norton Grade) were used to continuously dry dress a 1-inch face of a 12-inch diameter grinding

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wheel. Eight runs, 50 dressings per run, were made per tool, the tool being rotated 90 deg. about its axis at the start of each run.

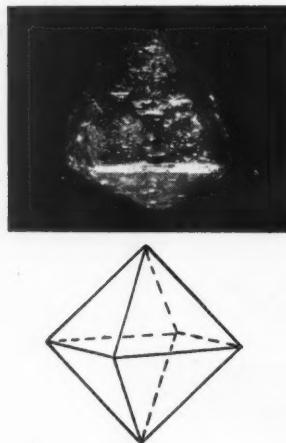


Fig. 5—Type 3; Class 1. Octahedron. Opacity 0.2. This diamond is symmetrically-shaped with "uniform" type of grain growth.

The wear of the stone in terms of weight loss ($\text{cts.} \times 10^3$), and the wear of the wheel in terms of volume loss (cu. in.) was ascertained by measurement and calculation. A wear rate ratio of weight of diamond lost per

volume of wheel removed was calculated for each diamond tested.

According to the wear test results and arrangement of data there appeared to be little difference in wear resistance between the transparent or transparent-to-translucent types of stones. See Table I. Both groups had about the same overall wear rate average and range in individual scatter. The translucent-to-opaque stones appeared to be, on the average, about one-half as durable as either of the other two groups. Some of the translucent-to-opaque stones (as shown by the scatter range in the 4th column) were, however, found to be as durable as any tested.

Since these results showed that the preferred types of stones were not as a group much, if any, more durable than the other types of stone (with the exception possibly of a few of the translucent-to-opaque varieties), it appeared at this point of the investigation that in case of an actual shortage almost any of the lower-quality stones could be used for substitution purposes.

Since some of the stones in each group, however, appeared to be 4, 5 or even 40 times as durable as other stones in that same group, the following question was raised: If substitu-

TABLE I
Wear Test Data on Transparent Translucent and Opaque Types of Diamonds

| Types of Diamonds Tested | | Wear Rate Ratio Cts $\times 10^{-3}$ /cu.in. | | No. Tested |
|----------------------------|---|---|------------------|---------------|
| General Group | Trade Designation | Group Avg. | Range of Scatter | |
| Transparent or Preferred | 1st grey rounds, 1st brown rounds, 1st yellow shapes, 1st grey shapes, 1st brown shapes, etc. | 34 | 12 to 49 | 7 |
| Transparent to Translucent | 1st colored rounds, 1st grey brown rounds, 2nd colored rounds, 2nd grey brown rounds, etc. | 22 | 9 to 46 | 12* |
| Translucent to Opaque | Common coated stones and cleavages, black and colored bort, etc. | 50 | 9 to 353 | 32** |

* Does not include data on one stone that chipped during 1st 50 passes.
** Does not include 2 stones that chipped during 1st 50 passes.



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TABLE II
**Table Showing Classification System for Diamonds on the Basis
of Crystalline Shape or Habit**

| Stones Having Uniform Structure | | Stones Having Non-Uniform Structure | |
|---------------------------------|------------------------------|-------------------------------------|------------------------------|
| Class No. | Habit | Class No. | Habit |
| 1 | Octahedron | 6 | Octahedron |
| 2 | Octahedron-Dodecahedron | 7 | Octahedron-Dodecahedron Cube |
| 3 | Dodecahedron | 8 | Octahedron-Dodecahedron Cube |
| 4 | Irregular (No crystal faces) | 9 | Octahedron-Dodecahedron Cube |
| 5 | Cube | 10 | Octahedron-Dodecahedron Cube |
| | | 11 | Irregular (No crystal faces) |
| | | 12 | Cube |

tions have to be made, why not substitute those stones which appear to be the most durable?

With this question in mind, attempts were made to set up a rather extensive but simple system which could be used to describe, for the convenience of the reader, the types of stones to which we refer.

In the development of this system

the stones were first classified into two main groups according to their continuity of grain growth. Stones which appeared to have grown under a more or less constant set of conditions were placed in what we have called the "uniform" group. When fractured, such stones show a uniform type of growth and dispersion of impurities throughout. They are usually



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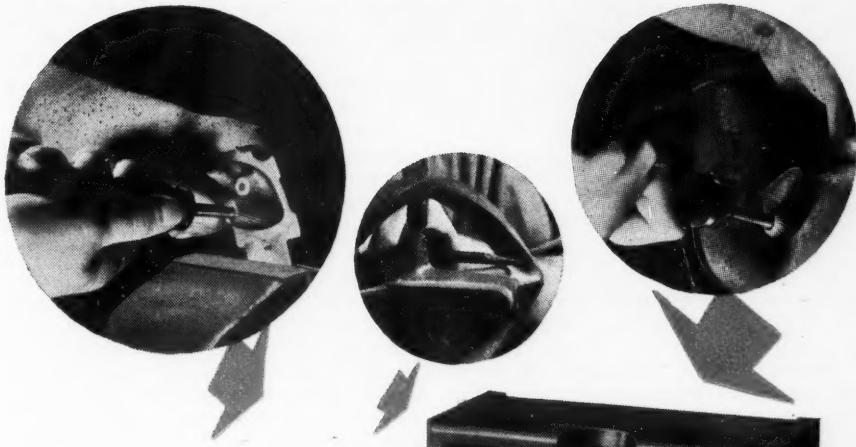
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TABLE III
**Table Showing System for Grading
 Diamonds on Basis of Opacity**

| Grade | Degree of Transparency |
|-------|----------------------------|
| 0.1 | Transparent |
| 0.2 | Semi-Transparent |
| 0.3 | Transparent to Translucent |
| 0.4 | Translucent |
| 0.5 | Semi-Translucent |
| 0.6 | Translucent to Opaque |
| 0.7 | Opaque |

transparent or semi-transparent; colorless or pale yellow, amber, pink or brown.

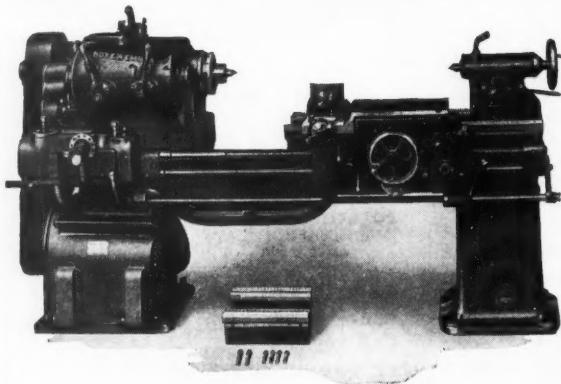
Stones which appeared to have grown under two sets of conditions were placed in the second group, called the "non-uniform" group. When fractured, these stones show a non-uniform type of growth and segregation of impurities. See Fig. 3 and 4. In contrast with the stones of the first group, they are generally translucent or opaque and are colored yellow grey, yellow

green, grey, olive green, slate or black. In the industry these types of stones, by virtue of their colorless inner core and colored outer rind, are often called "coated" stones.

The stones were then classified according to crystalline habit or shape. All the stones seemed to fall into one of 12 general classes, depending upon their type of grain growth. To simplify the task, five classes, numbering from 1 to 5, were set up for stones having a "uniform" grain growth and seven classes, numbering from 6 to 12, were set up for stones having a "non-uniform" grain growth. See Table II. As will be noticed from this table there appear to be but three basic shapes; the octahedron, dodecahedron and the cube. All of the other shapes appear to be combinations thereof. See Fig. 3, 4 and 5 for photographic examples and illustrative drawings.

Single symmetrically-shaped diamonds were classified as indicated in

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TABLE IV

Wear Test Data on Symmetrically and Non-Symmetrically Shaped Diamonds Having "Uniform" as well as "Non-Uniform" Types of Grain Growth

| Type of Grain Growth | Class of Stone | Wear Rate Ratio Cts x 10 ⁻⁵ Stone Lost | | No. of Stones Tested | Remarks on Chipping |
|----------------------------|----------------------|--|---------|-------------------------------|---------------------------|
| | | Cu.In. Wheel Removed Range | Average | | |
| "Uniform" | 1 | 11-30 | 20 | 5 | |
| | 2 | 10-20 | 15 | 2 | |
| | 3 | 10-20 | 15 | 7 | |
| | 5 | 15-42 | 29 | 3 | |
| | 1D | 34-108 | 59 | 3 | |
| | 2D | 32-50 | 42 | 4 | |
| | 3D | 38-49 | 41 | 3 | |
| | 6 | 31-52 | 41 | 2 | 2 stones chipped |
| | 7 | 9-24 | 15 | 5 | 1 stone chipped |
| | 8 | 9-61 | 28 | 8 | |
| "Non-Uniform" | 9 | 78-353 | 223 | 3 | |
| | 12 | 24-41 | 34 | 5 | |

Table I, for example; stones of Class 1, stones of Class 6, and so on. Non-symmetrically-shaped or distorted, twinned, or aggregated diamonds were classified in somewhat the same manner. The letters, D, T, or A were affixed, however, to the class number as indicated in Table I. See Fig. 9 for photographic examples and class designation for distorted stones.

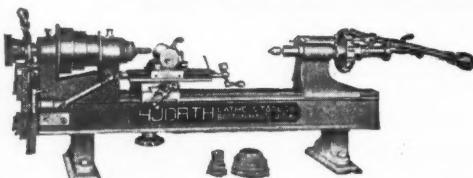
Finally, the stones were graded according to their degree of transparency. Seven grades were set up as shown in Table III. A single symmetrically shaped cube (class 5) having a transparency of Grades 0.2 (semi-transparent) would be designated as a Class 5.2 stone.

Reclassification of Stones and Wear Test Data

The stones tested in this investigation were classified in accordance with the system described, and the wear test results regrouped for analysis. See Table IV. As a matter of interest; most of the transparent or preferred types of stones as well as most of the more plentiful less perfect transparent-to-translucent varieties which we discussed earlier in this report appeared to fall into Classes 1, 2, 3, and 3D, whereas most of the translucent-to-opaque varieties appeared to fall largely into Classes 8 and 9.

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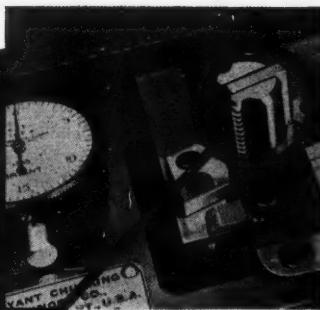
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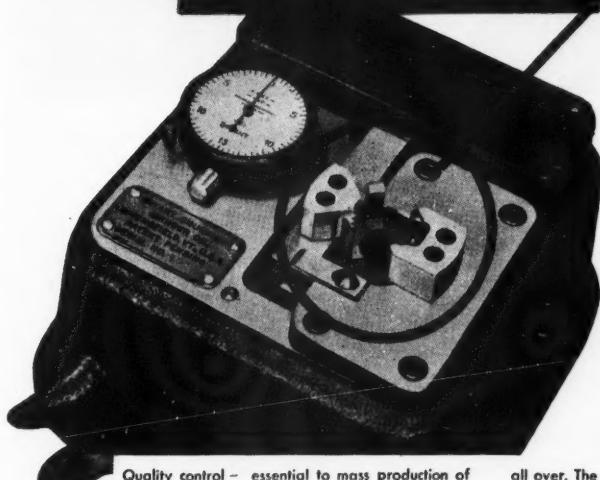
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Photographs illustrating characteristics of symmetrically-shaped diamonds having "uniform" type of grain growth.

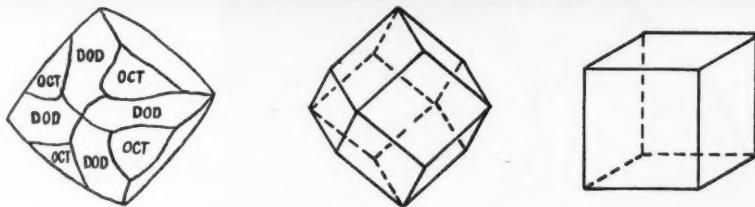
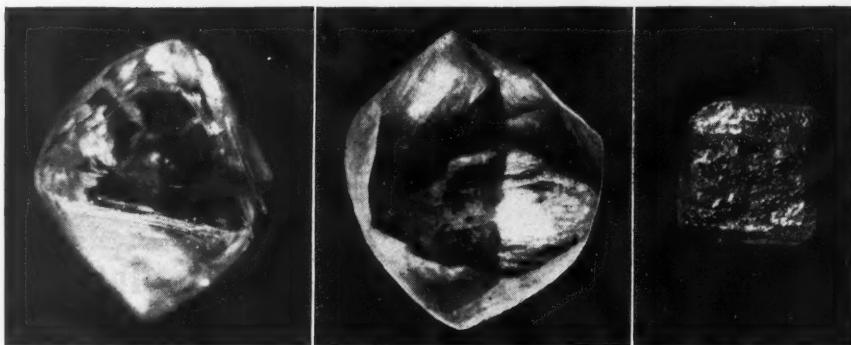


Fig. 6—(Left)—Type 4; Class 2. Octahedron-Dodecahedron. Opacity 0.1. (Center)—Type 5; Class 3. Dodecahedron. Opacity 0.1. (Type 4 includes all irregularly-shaped diamonds having uniform type of grain growth which have no crystalline faces). (Right)—Type 6; Class 5. Cube. Opacity 0.1

grouped according to this new system it appears that symmetrically-shaped stones are more durable than non-symmetrically-shaped or distorted stones. For stones of Classes 1, 2, and 3 this difference appears to be as much as three-fold.

The average wear rates of symmetrically-shaped stones appear to range between 15 and 223. Stones of Classes 2, 3 and 7 appear to be low with an average wear rate of 15. Stones of Classes 1, 8, 5, 12 and 6 appear to be intermediate with averages ranging between 20 and 41. Stones of Class 9 appear to be high with an average of 223.

On the basis of these wear test results and the newly-developed classification system, it seems that most of the symmetrically-shaped, more plen-

tiful, less perfect types of stones appear to be as durable, for wheel dressing purposes, at least, as the preferred high-quality types of stones that are now being used in the industry. Earlier in this report we mentioned that the preferred varieties had an average wear rate of 34. Specifically then, when we say "most," we refer to those stones which fall into Classes 1, 2, 3, 5, 7, 8 and 12.

In conclusion we should like to point out a number of factors for discussion, at least, which lead us to believe that the wear rate of a single stone is influenced to some extent by (1) its shape or degree of sphericity, (2) its orientation or its positioning in the tool nib and (3) its uniformity of grain growth.

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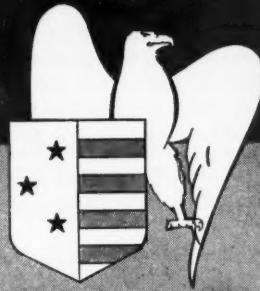
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Photographs illustrating characteristics of symmetrically-shaped diamonds having "non-uniform" type of grain growth.

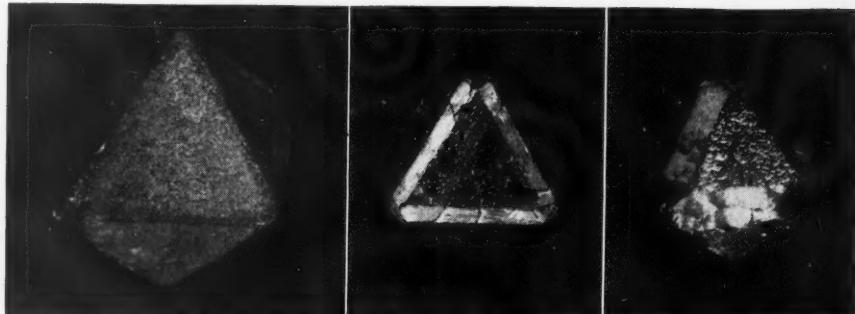


Fig. 7—(Left)—Type 7; Class 6. Octahedron. Opacity 0.2. (Center)—Type 8; Class 7. Octahedron-Dodecahedron-Cube. Opacity 0.4. (Right)—Type 9; Class 8. Octahedron-Dodecahedron-Cube. Opacity 0.5

Our test results show that spherically-shaped stones (Class 9) wear more rapidly than the pointed stones (Classes 1, 2 or 3). Can this difference in wear be attributed to the disintegrating effect of heat as related to shape? We know from test data that heat generated at the stonewheel interface has a marked affect on its wear rate. Stones wear five times as long when a coolant is used, as compared to dry dressing. If we assume that the heat generated at the interface is caused by friction, the total amount of heat evolved should increase with increase in the size of contact area. Since spherically-shaped stones have larger areas of contact per depth of stone removed than any of the other geometrically shaped stones, the results as tabulated appear to be in order.

Distorted stones appear to wear faster than symmetrically-shaped stones. Since these distorted types of stones have to be tilted in the tool nib when they are "pointed" could this increase in wear rate be due to the effect of grain orientation? Some of the symmetrically-shaped stones which also have to be tilted for pointing appear to be similarly affected. The values appear to range from 15 for the octahedral or dodecahedral-shaped stones, where the wear takes place over the vertical axis of the crystal (over a possible cubic face), to 29 or 34 for the cubes of Classes 5 or 12 where the axis of wear is about 55 deg. from the vertical axis (or over a possible octahedron face).

Some of the thinly-coated stones having a non-uniform type of grain growth appeared to break or chip

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Photographs illustrating characteristics of symmetrically-shaped diamonds having "non-uniform" type of grain growth.

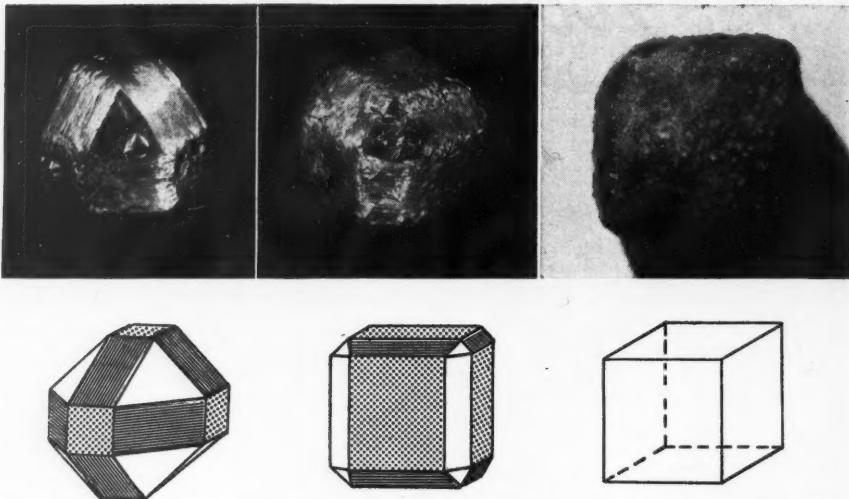


Fig. 8—(Left)—Type 10; Class 9. Octahedron-Dodecahedron-Cube. Opacity 0.3. (Center)—Type 11; Class 10. Octahedron-Dodecahedron-Cube. Opacity 0.4. (Class 11 includes all irregularly-shaped diamonds having non-uniform type of grain growth which have no crystalline faces). (Right)—Type 12; Class 12. Cube. Opacity 0.7

Photographs illustrating characteristics of non-symmetrically shaped diamonds having "uniform" as well as "non-uniform" types of grain growth.

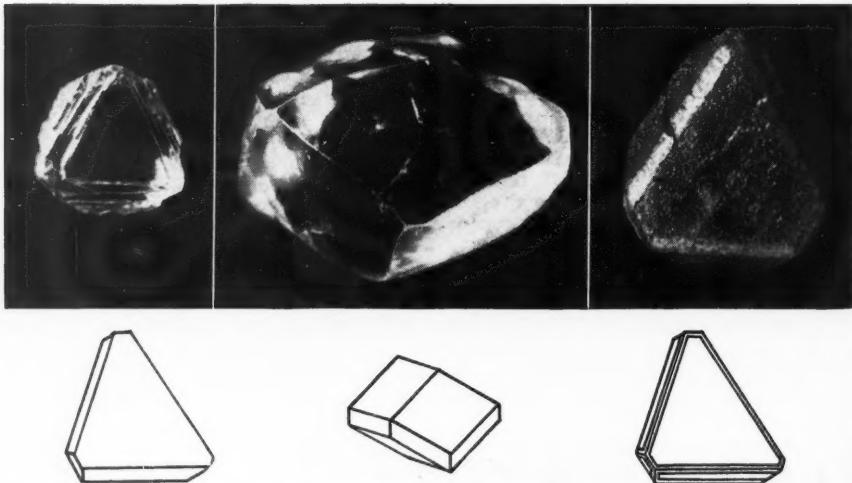


Fig. 9—(Left)—Type 13; Class 1D. Octahedron. Opacity 0.1. (Center)—Type 14; Class 3D. Opacity 0.1. (Right)—Type 15; Class 7D. Combination Octahedron-Dodecahedron-Cube. Opacity 0.4



Fig. 10—Type 16; Class 7.7. Opaque Octahedron Dodecahedron Cube

somewhat when the zone of wear approached the interface between the outer coating and inner core. Could this chipping tendency be due to a weakness of bond at the interface? If so, there should be a correlation between this chipping tendency and

thickness of coating. Thinly-coated stones should chip more readily than heavily-coated stones, because any shell, if thick enough, should tend to act as a single body. Test results show that 50 per cent of the stones of Class No. 6 chipped and 17 per cent of the stones of Class No. 7 chipped. Since the average thickness of this outer layer increases with increase in Class Number—from 0.07 mm for stones of Class 6 to over 3.00 mm for stones of Class 10—such a correlation might very well exist.

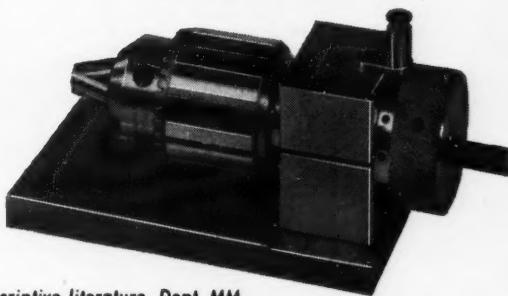
Under conditions of wet dressing, however, where the stresses set up are likely to be at a minimum, this interfacial weakness of bond between core and coating may be unimportant. For example; a thinly-coated stone was tested for wear on a Cincinnati Centerless Grinder under the following conditions: wet dressing; 0.001 inch cut; 20 x 6 x 12-inch No. 60M30 carborundum wheel; 15 deg. drag angle. The

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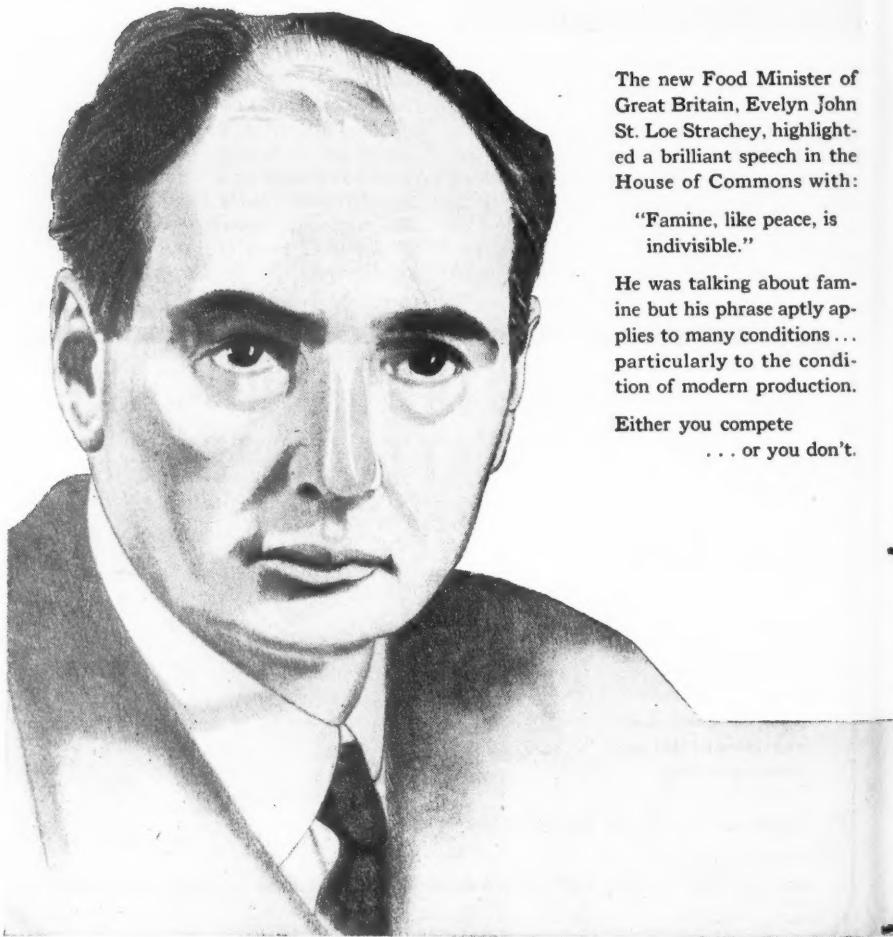


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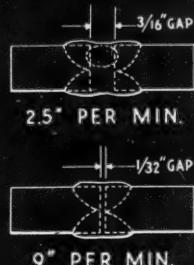
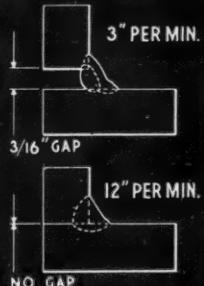
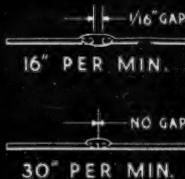
He was talking about famine but his phrase aptly applies to many conditions . . . particularly to the condition of modern production.

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EXAMPLE A—This square butt joint in $\frac{3}{8}$ " plate with gap of $\frac{3}{16}$ " is made at an arc speed of 2.5" per min. With recommended gap of $\frac{1}{32}$ ", speed is 9" per min. . . . 260% faster.

EXAMPLE B—This fillet weld in $\frac{1}{8}$ " plate, with $\frac{3}{16}$ " gap, is made at an arc speed of 3" per min. With no gap, speed is 12" per min. . . . 300% faster. Both welds have a $\frac{5}{16}$ " throat.

EXAMPLE C—This butt joint in 14 ga. sheet, with $\frac{1}{16}$ " gap, is made at an arc speed of

16" per min. With no gap, speed is 30" per min. . . . 87% faster.

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stone failed to show any signs of interfacial weakness or chipping after 448 passes. See Fig. 10. As will be noted, both the coating and the core (darker appearing areas) have been partially worn away.

REFERENCES

1. Substitution of Lower Quality Diamonds; War Metallurgy Committee Progress Report of November 6, 1943 by H. Whittaker, Crane Co.
2. Substitution of Lower Quality Diamonds; War Metallurgy Committee Progress Report of September 30, 1943 by H. Whittaker, Crane Co.
3. Substitution of Lower Quality Diamonds; War Metallurgy Committee Final Report, Part I, of December 31, 1943 by H. Whittaker, Crane Co.
4. Substitution of Lower Quality Diamonds; War Metallurgy Committee Final Report, Part II, of September 9, 1944 by H. Whittaker and J. T. Roberts, Crane Co.
5. Substitution of Lower Quality Industrial Diamonds in Diamond Dresser Tools, A.S. M.E. Transactions, January, 1946 by H. Whittaker, Consulting Engineer.

Carboly Film

Available to technical societies and industrial plants, a 25-minute sound motion picture dramatizing recent contributions to industrial progress by Carboly cemented carbide has been released by the Carboly Company, Inc., 11143 E. 8 Mile St., Detroit 32, Mich. The picture, entitled "Everyday Miracles," is designed to familiarize users of hard metal carbides with recent accomplishments resulting from the use of these metals, and also to stimulate thinking as to possible new applications. A general interest plot—combined with various specialized movie techniques—is employed to tell the story of past, present and possible future of the hard metal carbides.

The film depicts the growth and development of some of the industrial methods which have been made possible by the adoption of carbide tools, dies, wear-resistant inserts, and other Carboly parts. It ends on a prophetic note, graphically pointing out how the carbides—instead of being just tool-tipping materials—are actually becoming a new series of "use" metals whose practical applications seem to be limited only by the imaginations of development engineers and designers.

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mixture. To combat this difficulty in the manufacturing operations of two St. Louis concerns*, we recommended the application of Cities Service Anti-Corrode No. 148.

This product has proven very successful in removing finger stains as well as providing a suitable protection against rust until the part is shipped or assembled into a complete unit.



Actual unretouched photograph showing the corrosive effect of fingermarks on stainless steel.

A very desirable feature of Cities Service Anti-Corrode No. 148 is that it does not form a thick film which would make further handling disagreeable, and it is of such low viscosity that the user has only slight 'dragout' losses and his 'drippings' are negligible.

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*Names on Request



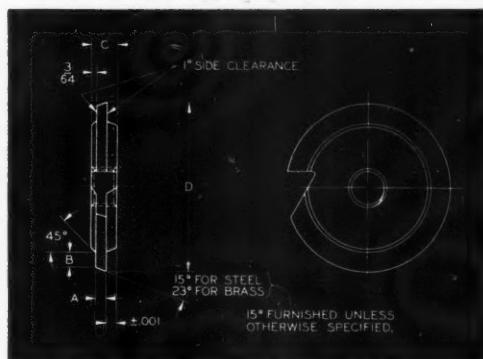
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| MACHINE NUMBER | TOOL NUMBER | MAXIMUM STOCK SIZE | A | B | C | D | PRICE EACH |
|----------------|-------------|--------------------|-------|-------|-------|--------|------------|
| 00 | 00C-031 | 3/16" | .031" | .103" | 1/4" | 1.750" | \$ 4.50 |
| 00 | 00C-046 | 1/4" | .046" | .135" | 1/4" | 1.750" | 4.50 |
| 00 | 00C-031 | 3/8" | .031" | .107" | 1/4" | 1.750" | 4.50 |
| 00 | 00F-062 | 3/8" | .062" | .197" | 1/4" | 1.750" | 4.50 |
| 00 | 00F-043 | 2 1/2" | .062" | .187" | 1/4" | 1.750" | 4.50 |
| 00 | 00Z-062 | 1/2" | .062" | .260" | 1/4" | 1.750" | 4.50 |
| 00 | 00Z-078 | 1/2" | .078" | .260" | 1/4" | 1.750" | 4.50 |
| 00 | 00Z-093 | 1/2" | .093" | .260" | 1/4" | 1.750" | 4.50 |
| 0 | DC-062 | 3/8" | .062" | .197" | 5/16" | 2.250" | \$ 5.00 |
| 0 | DC-078 | 1/2" | .078" | .260" | 5/16" | 2.250" | 5.00 |
| 0 | DF-062 | 3/8" | .062" | .322" | 5/16" | 2.250" | 5.00 |
| 0 | DF-078 | 3/8" | .078" | .322" | 5/16" | 2.250" | 5.00 |
| 0 | DF-093 | 3/8" | .093" | .322" | 5/16" | 2.250" | 5.00 |
| 2 | 2C-062 | 3/8" | .062" | .197" | 5/8" | 3.000" | \$ 8.00 |
| 2 | 2C-078 | 1/2" | .078" | .260" | 5/8" | 3.000" | 8.00 |
| 2 | 2C-093 | 5/8" | .093" | .322" | 5/8" | 3.000" | 8.00 |
| 2 | 2F-062 | 1" | .062" | .310" | 5/8" | 3.000" | 8.00 |
| 2 | 2F-078 | 1" | .078" | .310" | 5/8" | 3.000" | 8.00 |
| 2 | 2F-093 | 1" | .093" | .310" | 5/8" | 3.000" | 8.00 |
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WRITE FOR
BULLETIN F

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE

Cutting Costs with Modern Portable Tools

By F. B. ENGELN
Vice President, Rotor Tool Company

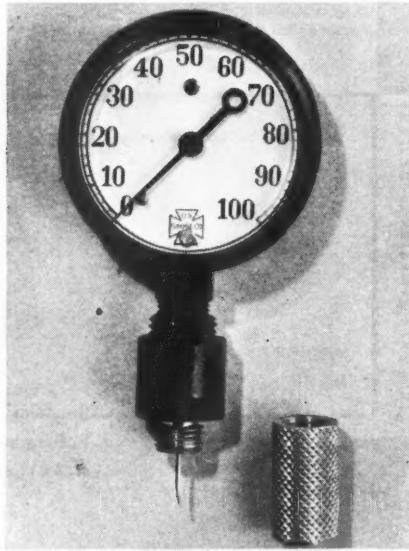
PORTABLE tools, such as grinders, buffers, sanders, drills, screw drivers and nut setters, chipping hammers, and so on, are being used in constantly-increasing numbers in metal-working plants to perform operations where it is obviously cheaper to carry the tool to the work than to move the work to a stationary machine. The amount of investment required is also

a consideration; the cost of a high grade portable tool will range from around \$48. to approximately \$200. In figuring operation costs, to tool investment must, of course, be added the labor cost and the overhead—both of which are usually less than the amounts set up for a machine tool.

The amount of production resulting from portable tool operations depends upon the efficiency of the equipment. If the operator is equipped with modern tools that are designed for plenty of power and high load speeds, and if the tool is light enough to be manipulated easily, his output will be high. Furthermore, it will continue to be high if the efficiency of the tools is maintained. A check-up on the output of the portable tool equipment in the average plant, whether of the rotating or percussion type, as a part of the general cost reduction program will frequently disclose many opportunities for substantial savings on costs.

In this article the author will endeavor to outline a concrete approach to the problems involved in cutting portable tool operating costs, based on the actual experience of users in the field as reported by portable tool engineers. The subject will be treated from three angles: (1) improving the efficiency of existing portable tool equipment (either Air or High Cycle Types); (2) cutting costs through better selection and applications of portable tool equipment and cutting acces-

Fig. 1—Typical Air Gauge with Hypodermic Needle for Checking Air Pressures, with Cap to Protect Needle



series, and (3) changing hand jobs to portable tool operations.

1. Improving Output of Existing Portable Tool Equipment

The first step is a careful examination of the equipment. Portable tools leave the factory ready to deliver the maximum of power and speed, but too often they are neglected for indefinite periods. In many cases they are not even oiled, and many tools are found operating at only one-half the original power. The development of the rotary type of air motor in recent years has made it possible to repair tools even after they have had considerable hard use and to bring them very close to their original efficiency without much expense for parts or labor.

Blades or vanes for the motors should be checked or replaced, oil reservoirs filled, needle valves checked, and air strainers cleaned. Such strainers are applied to the air handles of practically all portable air tools to keep out dirt and foreign matter such as particles of rubber from the hose, and very naturally in time they become clogged. The remedy is to take the strainer apart, clean out the dirt, and reassemble. Often a

ten-minute cleaning operation will increase the power of the tool from 20 to 40 per cent.

In case of air tools, the second step toward improving the output of existing equipment is to check the air pressure actually delivered at the end of the tool while the tool is running. The pressure shown on the air gauge at the compressor is deceptive. Frequently the 90 pounds pressure shown at the compressor is found to be reduced to 50 pounds or less at the tool under load. The loss is due to long or small pipe lines, restrictive valves, and par-

Table I—Table Showing How to Figure Correct Size of Pipe for Main Air Lines

1. Determine the cubic feet of air used per minute at the top of the table.
2. Find the total length of your main air line at the side of the table.
3. Read the pressure drop for the different sizes of pipe, and select the size of pipe that will deliver the air with a drop in pressure less than five pounds.

Bold figures indicate excessive pressure drop.

| Pressure Drop in..... | 1 $\frac{1}{4}$ " Main Line | | | 1 $\frac{1}{2}$ " Main Line | | |
|--------------------------------------|-----------------------------|------|-------------|-----------------------------|--------|--------|
| when | | | | Cu.Ft. | Cu.Ft. | Cu.Ft. |
| Air Consumption is..... | 250 | 100 | 500 | 250 | 100 | |
| Through the following Length of Pipe | | | | | | |
| 100 ft. | 4.0 | 0.7 | 7.1 | 1.8 | 0.3 | |
| 200 ft. | 8.0 | 1.3 | 14.2 | 3.6 | 0.6 | |
| 500 ft. | 20.2 | 3.3 | | 8.9 | 1.5 | |
| 1000 ft. | 40.4 | 6.5 | | 17.9 | 2.9 | |
| Pressure Drop in..... | 2" Main Line | | | 2 $\frac{1}{2}$ " Main Line | | |
| when | | | | Cu.Ft. | Cu.Ft. | Cu.Ft. |
| Air Consumption is... 700 | 500 | 250 | 700 | 500 | 250 | |
| Through the following Length of Pipe | | | | | | |
| 100 ft. | 3.8 | 1.9 | .5 | 1.5 | .8 | .2 |
| 200 ft. | 7.5 | 3.8 | 1.0 | 2.9 | 1.5 | .4 |
| 500 ft. | 18.8 | 9.6 | 2.4 | 7.3 | 3.8 | 1.0 |
| 1000 ft. | 38.2 | 19.2 | 4.8 | 14.5 | 7.5 | 1.9 |
| Pressure Drop in..... | 3" Main Line | | | 4" Main Line | | |
| when | | | | Cu.Ft. | Cu.Ft. | Cu.Ft. |
| Air Consumption is... 1500 | 1000 | 700 | 2000 | 1500 | 1000 | |
| Through the following Length of Pipe | | | | | | |
| 100 ft. | 2.1 | .9 | .5 | .9 | .5 | .2 |
| 200 ft. | 4.0 | 1.9 | .9 | 1.8 | 1.0 | .4 |
| 500 ft. | 10.5 | 4.7 | 2.3 | 4.4 | 2.5 | 1.1 |
| 1000 ft. | 21.0 | 9.3 | 4.6 | 8.8 | 4.9 | 2.2 |

- Determine the cubic feet of air used per minute through the down pipe at the top of table.
- Find the total length of the down pipe.
- Read the pressure drop for the different sizes of pipe, and select the size of down pipe that will deliver the air with a drop of pressure of less than five pounds. Because of some restrictions due to elbows, valves, select size of down pipe on the large size, and avoid $\frac{1}{2}$ " pipe for portable tools.

Bold figures indicate excessive pressure drop.

| Pressure Drop in..... | 3/4" Down Pipe | | 1" Down Pipe | | |
|---|-------------------------|-----------------------|-------------------------|-----------------------|----------------------|
| when Air Consumption is | | | | | |
| Air Consumption is | 100 Cu.Ft. Min. | 50 Cu.Ft. Min. | 150 Cu.Ft. Min. | 100 Cu.Ft. Min. | 50 Cu.Ft. Min. |
| Through the following Length of Pipe | | | | | |
| 25 ft. | 2.5 | .6 | 1.6 | .7 | |
| 50 ft. | 5.0 | 1.2 | 3.2 | 1.4 | |
| 75 ft. | 7.5 | 1.8 | 4.7 | 2.1 | .5 |
| 100 ft. | 10.0 | 2.5 | 6.3 | 2.8 | .7 |
| Pressure Drop in..... | 1 1/4" Drop Pipe | | 1 1/2" Drop Pipe | | |
| when Air Consumption is | | | | | |
| Air Consumption is | 200 Cu.Ft. Min. | 150 Cu.Ft. Min. | 400 Cu.Ft. Min. | 250 Cu.Ft. Min. | |
| Through the following Length of Pipe | | | | | |
| 25 ft. | .7 | .4 | 1.1 | .5 | |
| 50 ft. | 1.3 | .8 | 2.3 | .9 | |
| 75 ft. | 2.0 | 1.1 | 3.5 | 1.3 | |
| 100 ft. | 2.6 | 1.5 | 4.6 | 1.8 | |

Here's what a drop in pressure through your pipes, hose and fittings does to your grinding output.

If your pressure AT THE TOOL is

| | |
|-----------|---------------------------------|
| 95 pounds | YOUR METAL REMOVAL WILL BE 100% |
| 85 | 94.5% |
| 75 | 87.0% |
| 65 | 75% |
| 55 | 62% |
| 45 | 47% |

Table II—Table Showing How to Figure Correct Size of Pipe for Down Pipes

ticularly to small hose with perhaps a $\frac{1}{4}$ -inch nipple added to further cut the pressure.

Complete tables which show the drop in pressures in air lines due to various causes have been prepared by the Compressed Air Institute, but the Rotor Tool Company has found them somewhat technical and accordingly has prepared a sheet showing the data commonly used, "How to Figure the Correct Size of Pipe for Your Main

Air Line or Down Pipe," as shown in Tables I and II.

The tables show the pressure drop, for example, in a 2-inch main line where the air consumption is 500 feet per minute, and shows that when the line is more than 200 feet long the pressure drop becomes unduly high. For example; at 500 feet the drop is 9.6 pounds in the line alone. Moreover, air lines often become clogged with dirt, and sometimes too many manifolds are added. The remedy is either to install larger lines or to loop the line; that is, to provide an extra line from the compressor to the point of major use of air.

Measuring the actual amount of drop in pressure is a simple mat-

ter; an air gauge is used which is equipped with a hypodermic needle which is pushed into the air hose at the tool while the tool is running. The needle, shown attached to a gauge in Fig. 1, is pushed in at an angle so that the small hole thus made will seal itself, and the gauge will show the actual amount of air pressure delivered at the tool while the tool is operating.

It is difficult to measure the drop in pressure due to varying sizes of hose

Want to increase your cutting speed 20% . . . ?

Truly amazing results . . . speeds and feeds never before possible, have become commonplace in plant after plant which has switched to Cimcool. For this revolutionary *chemical emulsion* combines friction reduction and cooling capacity in a degree never before attained.

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- Covers 85% of all metal working jobs.

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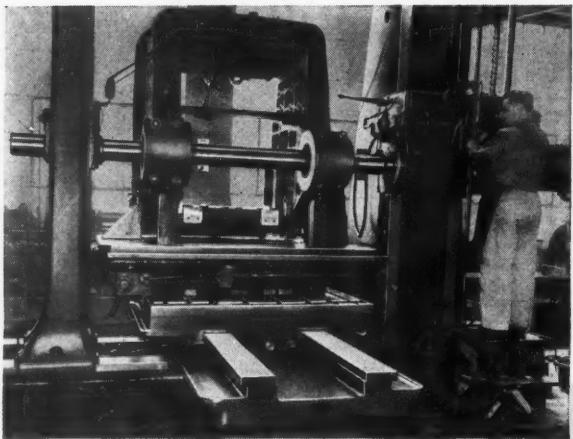
STAPLES TOOL
& ENGINEERING CO.
INCREASED SPEEDS 1/5
WITH CIMCOOL

"On our various milling operations, we have been able to increase our feeds and speeds by approximately 20% due to the greater cooling qualities of Cimcool," writes Staples Tool & Engineering Co., of Cincinnati, O.

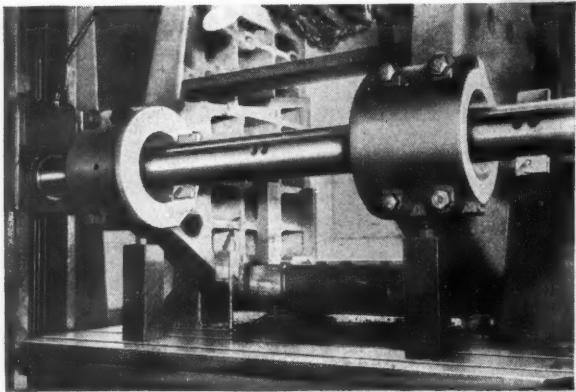
This company's letter is typical of many in our files. We will gladly show you others. Write today!

CIMCOOL

THE MULTI-PURPOSE CUTTING FLUID



Boring two bearings on a large crusher base simultaneously using a DAVIS line boring bar.



DAVIS expanding block type boring tools and line boring bar used to speed boring operations and hold alignment.

Photographs courtesy
Universal Engineering Corp.
Cedar Rapids, Iowa



DAVIS BORING TOOL DIVISION OF

BORING ON HEAVY



DAVIS expanding block construction showing cutter screw that expands and supports blade.



Regular Type



New Berlin



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Solid Type Block Cutter

Free ENGINEERING SERVICE

Effective solutions to your boring problems may be possible by using DAVIS boring bars equipped with expanding or micrometer adjustable block-type boring tools, or DAVIS boring tools of other types. DAVIS-engineered boring tools assure you of the most efficient handling of any boring job. Submit your problems for expert analysis and recommendations, enclosing prints if possible. There is no obligation for this service.

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HEAVY DUTY CRUSHER BASE . . .

Using DAVIS BLOCK-TYPE LINE BORING BAR and EXPANDING TOOLS

Interchangeable Block Type Cutters

Just as it is possible to obtain standard and special DAVIS boring bars in a wide range of types, it is also possible to secure a variety of cutter blocks to fit your individual production needs. The boring operations to be performed indicate which type DAVIS bars and cutter blocks to use. These interchangeable block type cutters will help you lower production costs.

2 Bearings bored simultaneously to $+.001"-.000$ tolerances — same work setting used for milling, facing, drilling and tapping.

A profitable 50% cut in boring time is being obtained since this job is handled with a DAVIS line boring bar, using two DAVIS expanding block-type boring tools equipped with two cutting blades each. Despite this marked increase in production, bores are held to a tolerance of $+.001"-.000$ in the operations performed.

With the boring set-up previously employed, a total of 105 to 110 hours was required for this work, depending on variations in the rough castings. The same job now requires only 51 to 56 hours since it is being handled with the DAVIS boring bar and tools on a Giddings & Lewis horizontal boring, drilling and milling machine.

MACHINING COMPLETED IN ONE WORK SET-UP

Only one work set-up is required for the entire job in this new machining sequence. The large crusher base is held in a fixture mounted on a rotary table on the machine table. Prior to boring, the top of the bearing is milled and the shoulder drilled and tapped to receive the cap. Several other machining operations are also performed with the workpiece in this position.

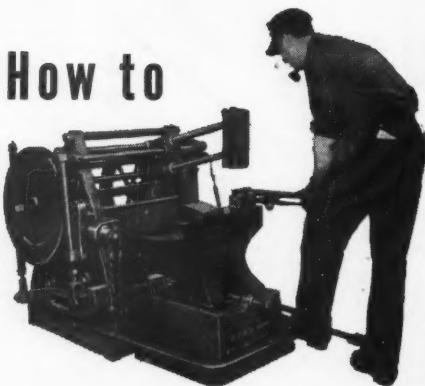
The two bearings are bored simultaneously as the two DAVIS expanding block-type tools are fed into the cut. Each block is made with two carbide-tipped blades to further speed the operation. The simple, efficient DAVIS boring bar and tool construction permits the operator quickly and easily to change the tool blocks as required for rough, semi-finish and finish boring.

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BLACKER
HAMMER

because hose conditions are too variable to be dependable, but it is obvious that in 100 feet of hose the drop in pressure will be more than the drop in a 50-foot length, and $\frac{1}{2}$ -inch hose will not carry as much air as $\frac{3}{4}$ -inch hose will carry. Manufacturers of air tools frequently list the sizes of hose required for the efficient operation of given tools, and in recent years these sizes have been increased. The new



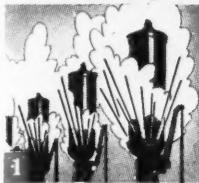
Fig. 2—Cone Grinding. The machine illustrated was substituted for a typical 6-inch grinder at 6,000 RPM because it was found that when wheels wore down, they would not reach the rough spots, resulting in low output.

lightweight $\frac{3}{4}$ -inch hose which was manufactured just prior to the war and restricted during war-time is now available again, and this hose provides far better pressures than $\frac{1}{2}$ -inch hose, although the weight is about the same.

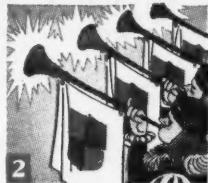
From our experience in recent years we have learned that, with 90 to 100 pounds pressure in the tank, the actual pressure at the tool is seldom above 80 pounds, often 70 pounds, and in many cases 50 or 55 pounds.

The following figures, reprinted

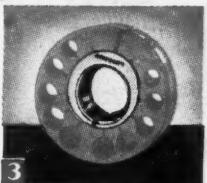
Holy Smokes! They've done it again!



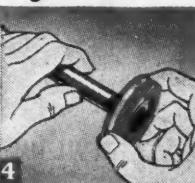
1 Now all the whistles! They've done it again!



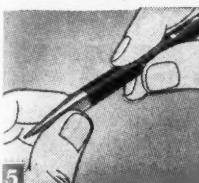
2 Blast out a fanfare for a great new Woodworth invention!



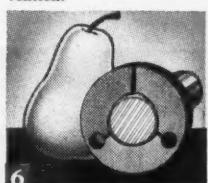
3 It's the WOODWORTH ADJUSTABLE THREAD Ring Gage.



4 Thread ring gages check the outside dimensions of threaded parts.



5 Adjusting 'em as they wear down saves time and money.



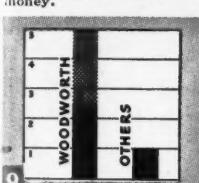
6 But old types get pear-shaped—lose accuracy—wear out fast.



7 Woodworth's New Thread Ring Gage adjusts perfectly—STAYS ROUND.



8 Never gets out of alignment when dropped or thrown about.



9 Wears 2 1/2 to 5 times longer—With equal distribution of wear.



10 Light Weight reduces operator fatigue—increases sensitivity.



11 It's amazingly accurate... ideal for hair-splitting work.



12 Woodworth's New Thread Ring Gage is an all-time champion!

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THE NEW Adjustable Thread Ring Gage, another revolutionary Woodworth instrument of accuracy, is now available to industry!

Employing an entirely new principle of design, and proven mathematically correct by actual tests, this gage assures roundness through the maximum range of adjustment.

Check these Five Important Advantages

1. **Greater Accuracy and Stability.** Stays round with adjustment. Threads held in alignment of thread helix angle with adjustment. Will not reject parts that should pass inspection.
2. **Longer Wear Life.** Equal distribution of wear over the full thread circumference, through the entire range of adjustment, increases wear life 2½ to 5 times.
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from "How to Figure Correct Size of Pipe," shows what loss of pressure does to grinding output.

| | |
|--------------------------------|----------------------------|
| If the pressure at the tool is | |
| 95 pounds, | metal removal will be 100% |
| 85 " | " 94.5 |
| 75 " | " 87 |
| 65 " | " 75 |
| 55 " | " 62 |
| 45 " | " 47 |

The remedy is a thorough check-up



Fig. 3—Example of the Right Tool for the Job with High Frequency Tools. Here a straight type of 6-inch High Cycle Tool has been used to grind down welds. A change was made to the angle type with a 6-inch flared cup wheel. The same operator at the same pay now produces 80 per cent more output per day and obtains smoother grinding with less fatigue.

of air lines in comparison to load, checkup of manifolds, and a ten-minute trial of a larger hose with the proper nipples. The cost of the additional air used at 5 cents per 1000 feet will be found small indeed compared to the increased output of the operators under today's factory conditions. The cost of compressing air is, of course,



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a variable factor in different plants. Where installations are reasonably large, this cost can be reduced as low as 3½ cents, but a figure of 5 cents is perhaps a better average for measuring improvements in output versus cost of additional air. The additional cost of air will, in general, be found to be from $\frac{1}{4}$ to $\frac{1}{2}$ of the value of the actual additional output expressed in terms of tonnage or units.

In the case of high cycle electrical

tools, the voltage delivered should be checked because, if the voltage is high—above 230 volts—the tools will tend to heat. Similarly, if voltage is low and a heavy load is applied, the tool will heat excessively. Where the line voltage is usually constant, little trouble will be found with frequency changers or motor generators. Where the line voltage varies, the motor generator with a manually-adjusted rheostat will correct the conditions.

II. Cutting Costs Through Better Selection of Portable Tool Equipment and Cutting Accessories

The designers of portable tools provide a wide variety of tools with varying motors, varying speeds, various shapes of handles and accessories, and so on. (In our own case; a total of 59 different grinders and drills of the air type; 53 of the high cycle electric type.) This trend has been accentuated by war production requirements, the developments of which are now available for peace production. A specific tool is developed for a specific type of work but, of course, will do somewhat similar work reasonably well.

Users of tools with practical experience in their own problems usually select types of tools that are best suited to their work. The variety available in the new types that have been developed in recent years suggests careful re-analysis of the types of tools in use on different operations.

For example; originally all casting



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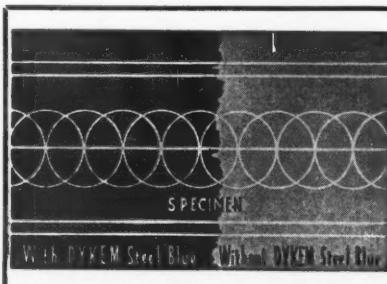


Fig. 4—By replacing 12-inch hand screw drivers with this Midget Screw Driver with Double Adjustable Clutch, operating at 1,000 RPM, the time on the job was cut to one-tenth the time required for the hand method.

cleaning was handled with 4, 6, or 8-inch straight-wheel grinders. Now cone-type grinders are available, made to run at 8500 r.p.m. and equipped with 2½-inch vitrified cone wheels for getting into corners and recesses. The 8500 r.p.m speed provides maximum cutting action. It is true that these cone wheels can be used on the straight-wheel type of grinder at 6000 r.p.m., but when a change is made to 8500 r.p.m., with proper backing for the cone wheel, we find that output will always be increased from 20 to 40 per cent and wheel life is greatly pro-

longed. The illustration Fig. 2 shows a cone wheel in action. Similarly, cup wheel grinders are now available which use 6 x 2-inch plain or flared cup wheels. These tools do much of the work formerly done by the use of straight - wheel grinders, and users refer to them as "all-round" grinders. On cutting down high spots, the cutting action is similar to that of a surface grinder, leaving a level surface without removing an excess of metal. On many types of work the exchange of the straight-wheel type of grinder for the vertical cup-wheel type will result in an increase in output of 20 to 50 per cent and in many cases will produce a better job. A cup-type wheel is shown in use in Fig. 3.

A re-analysis of the uses of portable tools in the average plant may well follow a check into the following ten



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CLEVELAND, OHIO, U. S. A.

PUNCHES

The central figure is a man in a dark suit and tie, looking down at a row of punches he is holding. Behind him is a large wall covered with various technical drawings and tables related to punch designs. On the left, there's a grid of drawings labeled Fig. 2 through Fig. 19, each showing a different punch profile with dimensions like 1/2", 1/4", 1/8", etc. To the right, there are more detailed drawings of specific punch shapes, including one labeled Fig. 28 and another labeled Fig. 29. Below these drawings is a table with columns for 'Fig.', 'Diameter', and 'Fig.' again. The table lists 29 rows of data, corresponding to the numbered figures above. At the bottom of the page, there's a row of physical punches displayed on a surface, matching the shapes shown in the drawings.

| Fig. | Diameter | Fig. |
|------|-----------------|------|
| 1 | 1/2" by 1/2" | 21 |
| 2 | 1/2" by 1/4" | 22 |
| 3 | 1/2" by 1/8" | 23 |
| 4 | 1/2" by 1/16" | 24 |
| 5 | 1/2" by 1/32" | 25 |
| 6 | 1/2" by 1/64" | 26 |
| 7 | 1/2" by 1/128" | 27 |
| 8 | 1/2" by 1/256" | 28 |
| 9 | 1/2" by 1/512" | 29 |
| 10 | 1/2" by 1/1024" | |
| 11 | | |
| 12 | | |
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Page last

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WE STOCK IT IN 29 PUNCHING DIAMETERS

and as this is but one of our twenty-one standards you can imagine the enormous quantity of Punches carried in stock to meet immediate demands. Besides, for each standard Punch there is a standard Die, consequently our stock of Dies is as varied as our stock of Punches.

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At the bottom right, there are five small diagrams illustrating different punch shapes: a square, a rectangle, an oval, a semi-oval, and an irregular shape. Each diagram shows a cross-section of the punch with dimensions labeled L and A.

Small Tools THE CLEVELAND PUNCH & SHEAR WORKS COMPANY Cleveland, Ohio
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broad types of portable tool applications:

Straight wheel grinding
Cone grinding
Cup wheel grinding
Sanding
Buffing
Wire brushing
Small wheel grinding
Drilling and reaming
Screw driving and Nut Setting
Percussion work; Chipping, Riveting, Etc.

Changing from Hand to Power

During the war a great many relatively light hand jobs were changed to power jobs in order to increase production, and in a short time it was discovered that costs on these jobs had radically been reduced. Among these jobs were small polishing and grinding operations on welds, dies, metal patterns, and so on.

A particularly outstanding example

of cost reduction in this field was discovered when power-driven screw drivers and nut setters were applied on a large variety of assembly operations that formerly were done by hand. Costly and tedious hand operations were eliminated and the tasks were performed from three to ten times faster, as shown by time studies.

Some misconceptions seem to exist concerning the difficulties of changing from hand to power on this type of work. Actually, the operation of a power screw driver, for example, is simple and the tool is light in weight and easy to handle. The results are positive and speedy. Pneumatic or high cycle electric screw drivers are equipped with adjustable clutches which drive the screw home with a definite, uniform tension, independent of variations in air pressure or length of time applied to the operation. Clutches ensure uniform results, the shock being absorbed by the clutch.

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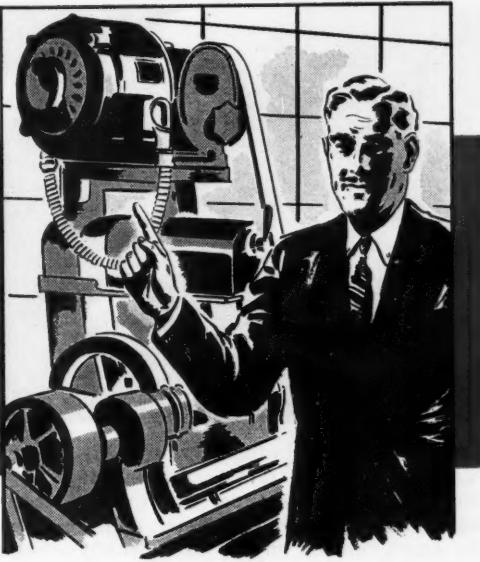
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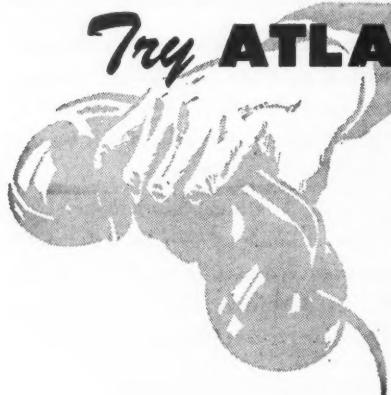
Fig. 5—These nuts formerly were set by two operators, using a hand socket wrench. By changing from a hand to a power job, using the Mid-Get Nut Setter, 1,000 RPM, the line was kept operating with one operator.

Nut setting is similarly done, using various types of double adjustable clutches and, of course, the proper socket to hold the nut. Here, again, the exact tension on the nut is easily controlled by the clutch adjustment. Recent developments in clutch design

have provided considerably larger capacities for light weight tools in this field. Many users have been surprised at the "easy power" of relatively small screw drivers and nut setters, and at the long life and low maintenance charges on these tools. A power screw driver is shown in operation in Fig. 4, and in Fig. 5 is shown the operation of setting a nut with a power nut setter.

In this article the author has at-

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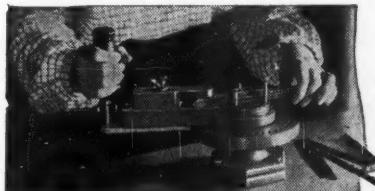
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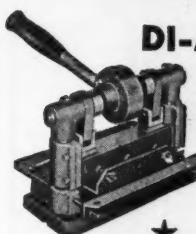
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tempted to suggest a practical approach to the problems of cutting costs by the use of portable tools of the pneumatic or high cycle types, based on actual experience of the users as shown by case histories made by our Portable Tool Engineers. The fact is that costs of portable tool operations are often overlooked, compared to the more obvious, large machine operations, and that in many plants the costs on portable tool operations can easily and quickly be reduced by a thorough analysis along the lines suggested above.

It might be added that manufacturers of portable air tools are prepared to furnish assistance in such programs, but it must be emphasized that the basic thinking and approach are properly the function of the operating executives who are familiar with the individual plant problems. Their basic approach to the problems, supplemented by practical help from manufacturers' representatives, will suggest trials of different types of tools as well as correction of air or electric current conditions which may well lead to substantial and continuing reductions in costs.

"How to Cut Costs with Rotor Air Tools" is the title of a 44-page booklet published by The Rotor Tool Co., 17325 Euclid Ave., Cleveland, Ohio, the purpose of which is to first of all emphasize the true costs of portable tool operations and then to suggest specific methods for cutting costs for nine types of portable tool operations: 8, 6, and 4-inch straight wheel grinding; cone grinding; cup wheel grinding; sanding; buffing; wire brushing; small wheel grinding, drilling and reaming; and screw driving and nut setting.

The problems of cutting costs in each field of application are treated separately showing (1) where to use each basic type of portable tool, (2) how to increase metal removal with each type, (3) examples based on actual case histories, and (4) emphasis on air conditions. Copy of Booklet No. 30 free to mechanical executives upon request.

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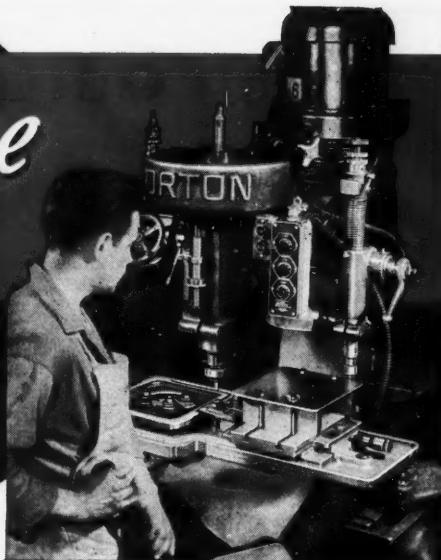
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JOB FACTS

NAME OF PART—Packaging Machine Cover

MATERIAL—Cast Iron

MACHINE—Gorton 9-J Duplicator

OPERATION—Mill Gasket Groove—10 in lot

ACTUAL CUTTING TIME—4½ Minutes each

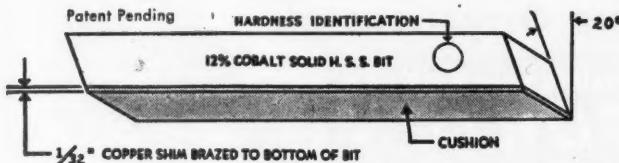
CUTTING TOOLS—Gorton End Mill—10 Pieces per Sharpening

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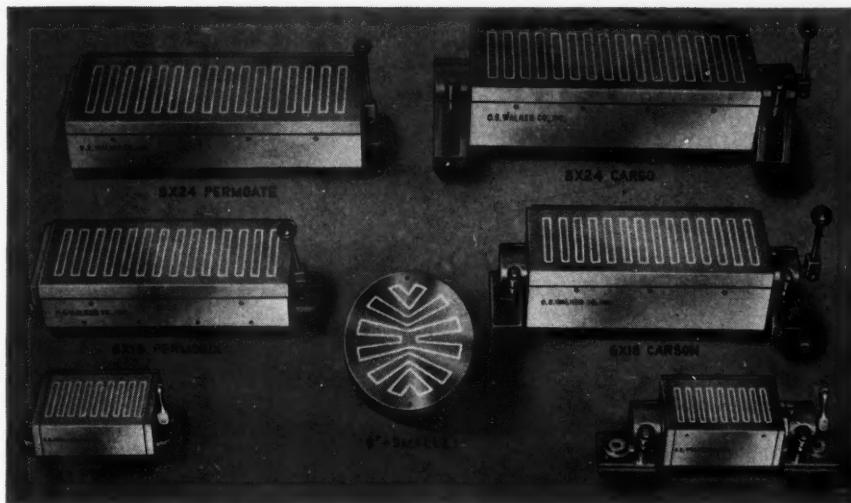
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A New Method of Gear Grinding

By T. J. PUTZ and H. W. SEMAR

South Philadelphia, Pa.
Westinghouse Electric Corporation

THE trend of requirements for gear ing by industry generally and the transportation industry in particular is for greater torque transmission, frequently at a wider speed change, and without any increase in dimensions and weight. Inasmuch as size and weight

are proportional to the load-carrying capacity of the gear the limits of gear of given hardness are set by such difficulties as pitting and galling of the tooth surface. For conventional gearing, these load-carrying limits have been established and further gains can be made only by using harder gear materials built to the highest degree of accuracy and surface finish. About the hardest steel in which gear teeth can be cut by the conventional hobbing methods is 350 Brinell. Further reductions in gear size and weight require the development of tooth surfaces in hardened steel, finished to the highest degree of accuracy and surface finish.

Grinding is a long-established method of finishing the working surface of gear teeth in steel above the hobbing range. There are many established grinding methods for finishing gear teeth. In the transportation field, namely, the automotive, air-



One reason the geared-turbine locomotive is possible is the compact, heavily loaded gear. Here the high-speed pinion is being formed by grinding.

5

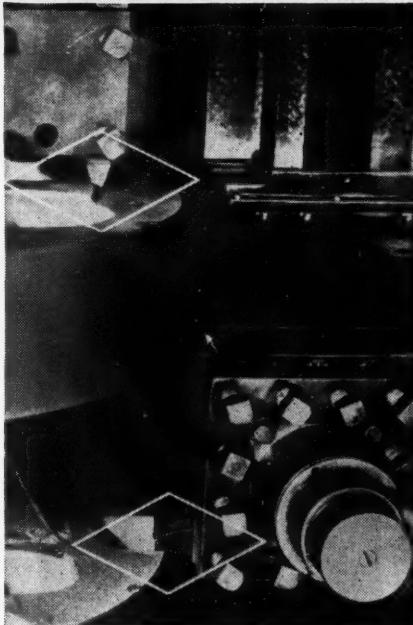
times as many pieces per grind
—at double the feed and
triple the speed with

FIRTHITE

CONDITIONS

- Depth of cut— $1/4"$ to $3/8"$
(note intermittent cut over holes)
- Feed per revolution
 $—1/16"$
- Cutting speed—
190 feet per minute
- Grade used—Firthite H

Firthite sintered carbide used on this job of turning and facing a cast iron spindle carrier achieved: greater output with increased cutting speed . . . 190 fpm instead of former 55 fpm; feed per revolution $1/16$ inch as compared with $1/32$ inch. A significant Firthite case history.



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craft, railway industries, full advantage has been taken of these grinding processes in building compact gear transmissions. However, these established grinding methods do not produce a gear of sufficient accuracy for turbine transmissions where quiet operation is essential at speeds up to 20,000 feet per minute and powers up to 53,000 horsepower.

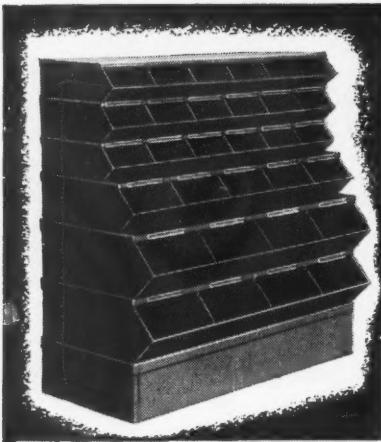
To obtain gears of the sizes and accuracies needed for turbine transmissions, a new method of grinding gear teeth suitable for large double-helical gearing has been developed. By other grinding methods one tooth is ground at a time while the stock is held stationary. Then the stock is indexed and the next tooth cut. In this new method, the heavy gear blank is rotated slowly and continuously during grinding and is not subjected to the starts, stops, and reversals that limit other processes to gears of lower speeds.

The grinding surface is the flat side

of a wheel that is analogous to the plane surface of a rack tooth in its generating action. The wheel is automatically dressed and compensated for wear at regular intervals by advancing the wheel and traversing it with a diamond during the return of the cutting stroke. The grinding plane is thus maintained by the position of the diamond, independent of wheel wear.

The generating action is accomplished by a cyclic motion of the grinder head. In the generating phase of this motion the grinding wheel moves slowly in a straight line and at uniform speed. The wheel then withdraws, returns, and re-enters the adjacent tooth to start the next cycle.

Because the cyclic motion of the grinder head is analogous to the rotation of the hob, the other motions, feed and indexing, are similar to the corresponding motions in hobbing. Therefore, the high orders of accuracy that permit hobbed gears to operate



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FORMS CARBIDE TOOLS — OR HIGH SPEED TOOLS

Radiform
TRADE MARK REG.

**- WITH EASE
SPEED
ACCURACY**



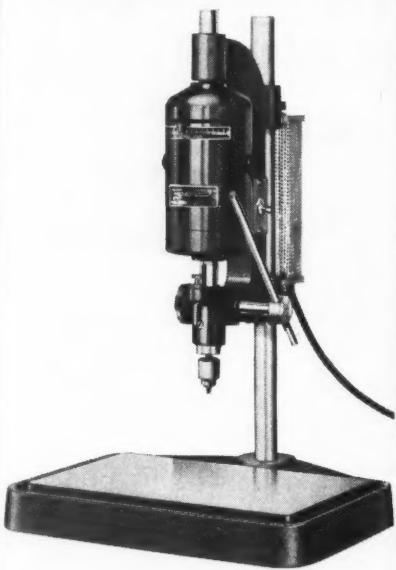
Radiform set up to generate 3/16" concave radius on a carbide tool bit.

With the Improved Meyers Radiform, you can generate the form directly on tool bits, end mills, milling cutters and similar tools of high speed steel or carbide without first forming the wheel . . . and you can also form the grinding wheel itself. Micro-inch finish, with predetermined contours and clear-

ance angles accurately controlled, is easily obtained on the most intricate work. The Radiform is easy to operate and easy to install on your various machines . . . and it is now available for immediate delivery. So write or wire today for complete information and descriptive literature just off the press.

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ELECTRO-MECHANO HIGH SPEED PRECISION DRILL PRESS



**FOR FAST, SENSITIVE,
ACCURATE AND DEPENDABLE
SMALL HOLE DRILLING**

QUICK SET-UP is assured by finger tip speed control which is completely variable and instantly adjustable. Speed ranges are 1000 - 10000 or 2500 - 15000 RPM.

ACCURATE and DEPENDABLE: Speed control governor, powerful motor and sturdy spindle are integrally mounted on three specially selected ball bearings for long, dependable, vibration-free operation even at maximum speeds. Chuck runout is .0001" max. FAST OPERATION with MINIMIZED DRILL BREAKAGE results from low vibration level, selective fine or coarse quill feed and accurate maintenance of set drill speed. Drills .004" to 5/32".

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Bulletin 102

The ELECTRO-MECHANO Co.



261 E. Erie St.

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quietly at high speeds can be obtained with the ground gears. The method is without limit to gear size. It could be applied, if necessary, to the largest size of gears built on hobbing machines.

The advantage in reduced weight and space requirements for naval propulsion, realized by using hardened and ground gears, has long been recognized. However, the need for large numbers of proven and standardized designs during the war postponed this development. A light weight 6000-hp gear for ship propulsion is now being designed on the basis of this new grinding technique.

In the development of the geared-turbine locomotive now operating on the Pennsylvania Railroad the severe space limitations suggested the use of hardened (500 to 550 Brinell) and ground teeth. This gearing has recently been inspected after 47,700 miles of main-line operation and has been found to be in excellent condition. The ground gear was 7.3 inches in diameter. A hobbed gear would have been about 9 inches in diameter and 2 inches longer.

Gear grinding technique applied to harder steels is changing our notions of gear loading. Already experimental gears have been operated for several thousand hours at loadings five times normal. The prospect is for smaller, lighter gears.

"DoAll Equals Ten Plus." The technique of contour machining and its application in metal-working shops is clearly demonstrated in a 22-page booklet, "DoAll Equals Ten Plus," now available free to shop superintendents, foremen, tool and diemakers, machinists, and students. Designed for carrying in the shop-coat pocket or tool chest for use as a ready reference on machining operations, the booklet is a pictorial time study of metal fabricating short cuts. Copy is available free by writing to The DoAll Co., 1306 Washington Ave., S. Minneapolis 4, Minnesota.

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FASTER CUTTING ACTION — Pace setting CHICAGOS, backed by half a century of experience, are skillfully engineered to turn out work in less time; to increase production per man-hour, cut costs!

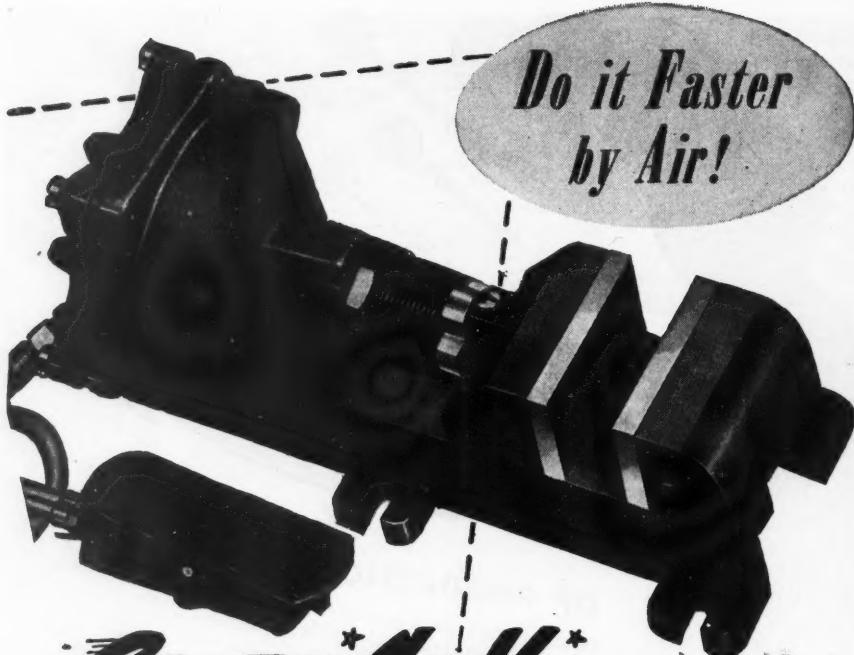
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Seeking faster production methods, busy plants have discovered new, powerful Speedy Air Vises! From a single vise to an installation of fifty, they cut time, money and labor costs. Air operated, *foot-controlled*, both hands are left free for more rapid drilling, tapping, light milling, assembly, etc. Complete \$29.90 with Foot Control Valve, Air Hose and Fittings, only.....

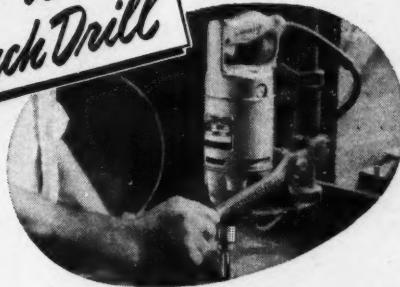
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|  AIR REGULATOR Precision - built. Delivers pressures up to 140 lbs. With gauge, \$4.95 Less gauge, \$3.10 |  AIR FILTER Keeps water and particles out of the regulator and pneumatic tools. \$1.85 |  BLOW-GUN Looks and operates like a gun. Ideal for cleaning and blowing out chips, dust, filings, scraps, etc. . . \$3.00 |
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*Hand Drill
or
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**In hand or on stand
ONE electric drill does the job**

When you buy a Stanley Electric Drill you get two highly efficient tools for the price of one . . . for the Stanley Drill operates with speed and accuracy in the stand as a bench drill or separately as a portable drill.

This extra utility, double-duty drill, gives you double your money's worth. Write for folder on complete line. Stanley Electric Tools, New Britain, Connecticut.

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HARDWARE · HAND TOOLS · ELECTRIC TOOLS



Fig. 1—Defective welds in the Janitrol aircraft heater are inaccessible for repairs after final assembly tests are made. The inner cylinder, which is the combustion chamber, is surrounded by an inner return and outer return tubes, all with welded seams which must be gas-tight.

Fluorescent Penetrant Testing of Welded Seams Speeds Production of Aircraft Heaters

Black Light for Weld Inspection

By SANFORD MARKEY

A REDUCTION of rejects on Janitrol aircraft heaters from 15 per cent to $\frac{1}{2}$ per cent through the application of black light as an inspection tool has been reported by Surface Combustion Corporation, Toledo, Ohio.

The design of the aircraft heaters, which are made at the company's Columbus, Ohio, plant, includes a cylindrical-shaped jacket of stainless steel and a combustion chamber of the same material and of slightly less di-

ameter. The chamber is enclosed in the jacket, which is seam-welded to form a complete cylinder. The welded seam in the jacket and similar seams in many other parts of the heater must be gas-tight to prevent leakage of gas fumes from the combustion chamber into the plane cabin.

As may be seen in Fig. 1, the construction of the heater is such that any holes discovered in the final test would be inaccessible for repair. For



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In the flexible shaft line durability counts—and Haskins Flexible Shaft Machines are durable.

These portable tools will stand continuous hour after hour use—three shifts a day—seven days a week. They'll turn out more work—better work—faster and easier, with longer trouble-free operation. For grinding, sanding, rotary filing, wire brushing, buffing or polishing—use Haskins machines—use them hard. They won't let you down! Send for details.

HS-7
1 H.P. Multi-speed
countershaft unit.
975 to 3100 RPM.
Three wheel heavy
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FLEXIBLE SHAFT EQUIPMENT

GRAPHITE GUS SAYS:



**...that's why DIXON'S
LATHE CENTER LUBRICANT
STOPS**

- WEAR
- SCORCHING
- BURNING
- BREAKDOWN



It will pay you to keep a tube by every lathe in the shop. And to use it for other hot-spot lube problems where extreme film strength is required.

DIXON'S GRAPH-AIR GUN TYPE 4

Filled with Microfyné graphite, it's the slickest gadget you ever saw for lubricating locks and other hard-to-reach mechanisms, in shop, office, car, boat, home. Read Data Sheet #8. Buy a gun at your supply house. 30¢.



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DIXON DATA SHEET DIRECTORY. IT
LISTS 20 FAMOUS GRAPHITE PRODUCTS**

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that reason, several tests are required before final assembly.

When the Janitrol aircraft heater was developed, after the start of the war, the method used to locate holes in welds consisted in sealing the part, immersing it in water, and applying air pressure so that the presence of



Fig. 2—The operator applies a few drops of penetrant containing fluorescent material to the inside of the welded seams, taking care that none of the fluid gets onto the exterior surface. After standing long enough to allow the penetrant to flow over the seam, the piece is placed under a black light beam which detects leaks in the seams.

holes would be indicated by air bubbles. The operation of sealing the assemblies was slow and cumbersome, and because of the difficulty of closing all openings tightly, two to three pounds of air pressure was all that

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A Size For Every Purpose



THE indestructible drive and rigid, yet simple, construction of the Continental Interchangeable Counterbores assure long dependable service.

CONTINENTAL Interchangeable Counterbores are now available in a choice of three sets, each providing a wide variety of useful, dependable tools. In complete yet compact form, you will find a selection designed to fill the needs of the large or small toolroom. Set No. 1 (illustrated), for the small shop, includes cutters up to $1\frac{1}{16}$ " diameter, with two holders. Whichever set you choose, you will get fine, precision-made cutting tools.

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High Speed Steel Tool Bits

Carbide Tipped Tool Bits

Circular Form Tools

Cut-off Tools

Flat Form Tools

Dovetail Form Tools

46-44

could be used. With such low pressure, many of the small holes escaped detection.

In an effort to find an answer to the problem the company's engineers turned to the use of "black light" and after much experimenting discovered a method of using black light effectively. Using an eye dropper, a few drops of penetrant oil containing fluorescent material are applied to the inside of the welded seam, as shown in Fig. 2. Within 30 minutes the penetrant will have reached the most minute hole, and will filter through.

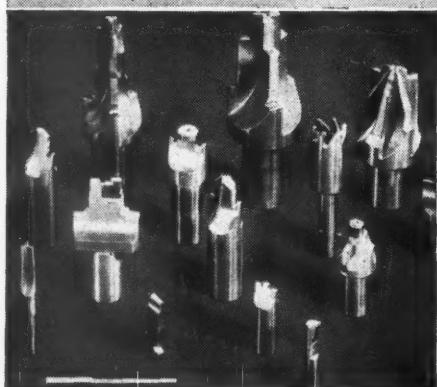
At the end of the 30-minute period each assembly, in turn, is taken into a semi-dark booth and placed in position so that the rays of black light can be directed upon the seam, as shown in Fig. 3. The black light rays are invisible to the human eye, but have the power to excite the fluorescent material in the penetrant oil and cause it to flow; thus a glowing spot

means that the penetrant has found a minute hole in the welded seam. The spot is then marked with red crayon and the piece is returned to the welders for repair.

The effectiveness of black light testing is revealed by a check test conducted by the Surface Combustion engineers. A heater assembly which contained 14 known leaks was permitted to proceed along the assembly line to the final test. It was then subjected to the under-water test formerly used, with the air pressure at 12 pounds per square inch—far more pressure than was practicable on a production basis. The water test revealed but three of the 14 known leaks. When subjected to the black light test, all 14 of the leaks were found.

The Janitrol aircraft heaters vary in size according to their heat output. The unit with a 100,000 Btu-per-hour output—slightly more than that of a conventional-type furnace of the type

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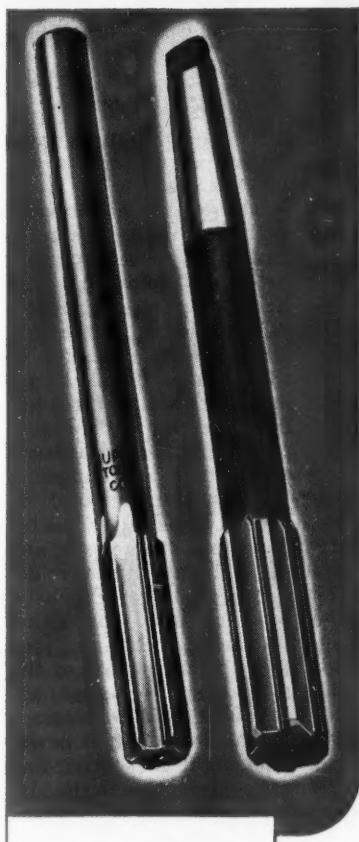
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CARBIDE TIPPED FULL LENGTH
FLUTES
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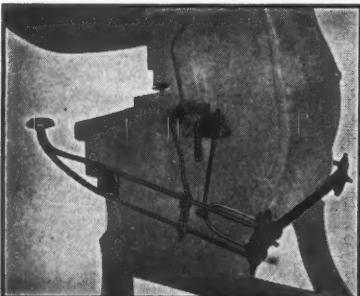
Fig. 3—in a semi-dark booth the aircraft heater assembly is positioned so that it will be flooded by the rays of black light. If any of the fluorescent-carrying penetrant has found its way through leaks in the seam, the black light rays will cause it to glow and thus reveal the presence of a hole.

with rejects running under 1 per cent on the last 45,000 heaters.

The heater has several points of military significance, the most important being its ability to stay lighted in high altitudes where the air is too thin to support combustion in the conventional type heater. Other features are light weight, faithful performance at any altitude or under sudden changes in

air pressure, as in a dive or climb.

The point is that the Janitrol heater has overcome serious obstacles in aircraft heating and the military demands have increased tremendously. With the previous slow inspection methods bottle-necking deliveries, plus the fact that a substantial part of the production was being scrapped because of defects which did not become apparent until the final test, it is obvious that black light inspection has made a definite contribution to the aircraft production program.



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Combination Gate and Barrier Guards
Two-Hand Safety Starting Devices
Sweep Guards . . . Single-Stroke Attachments
Stock Reels . . . Fly Wheel Guards, etc.

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Desmond makes the only complete line of grinding wheel dressers and cutters available—each item designed for proper cutting action on its particular job—to give you maximum service from your grinding wheels. Write for complete catalog and the name of your nearest jobber.

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BALL BEARING
DRESSERS



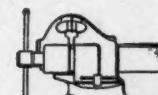
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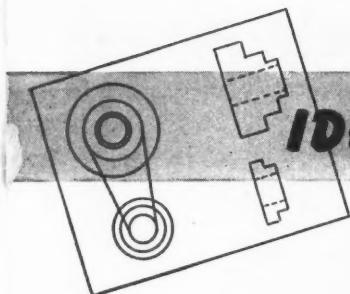
DIAMOND HAND TOOLS
AND NIBS



WHEEL TYPE
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SIMPLEX
STEEL-SLIDE VISES



IDEAS FROM READERS

Torch-Annealing on the Job

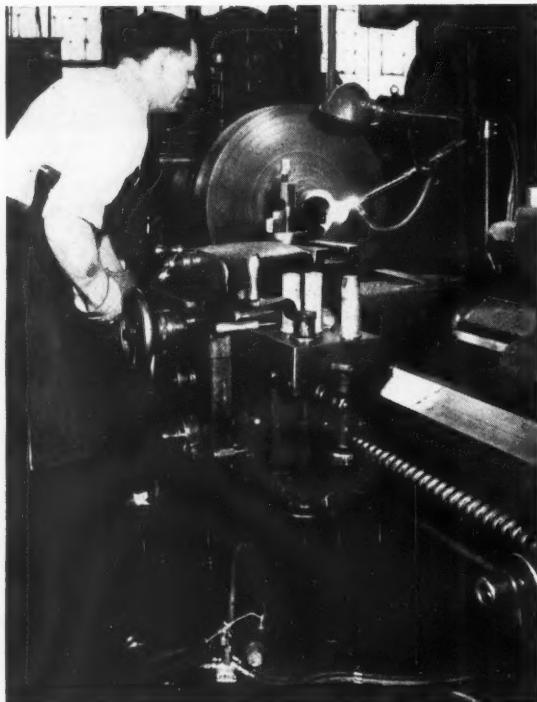
By V. H. LAUGHNER
Westinghouse Electric Corporation

IN the process of forming parts from sheet metal by the "spinning" process, the metal frequently becomes

work-hardened and must be annealed before the operation can be completed. In order to get the annealing job done without loss of time, the engineers at the East Pittsburgh Works of Westinghouse mounted a gas torch on a spinning lathe at a point which would permit directing the flame onto the work as shown in the illustration.

The piece in process in the lathe as shown here is a section of half-hard brass tubing that is intended to serve as a hanger for mounting a transformer. The end of the tubing is spun down to about one inch diameter, so that it resembles a shell when completed. Before the torch-annealing device was developed, it was impossible to spin such work to such a small diameter, due to the difficulties set up by work-hardening.

Both the oxygen and acetylene tanks are connected with the gas supply line, which is controlled by a foot-valve. When it is



Gas Torch Mounted on Spinning Lathe Provides Means of Annealing Work-Hardened pieces without Removing from the Lathe

PROSSER

Carbide Grinders

MODEL

A1

10"

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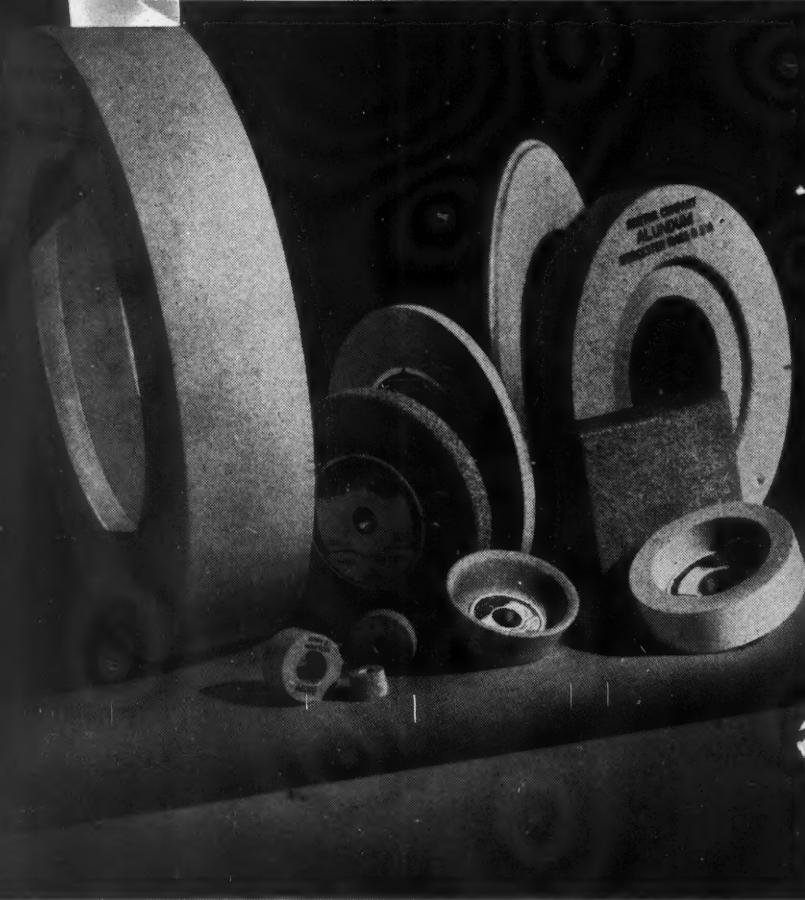
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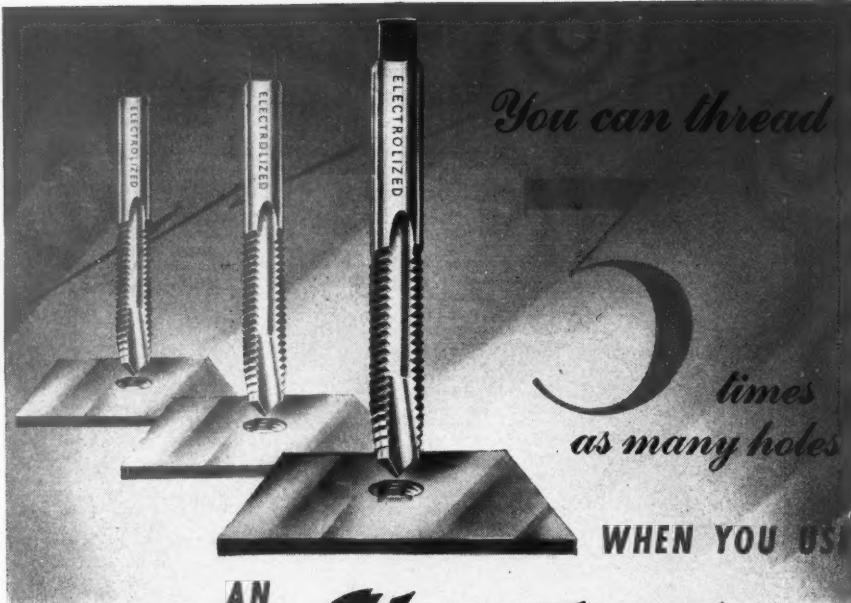
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High speed steel taps of the finest quality, accuracy and workmanship are *electrolyzed* by a new scientific process that combines high voltage with a chemical bath and a rare metal.

The result — a tap case with an extremely tough alloy which multiplies wear resistance, reduces chip and surface friction, produces cleaner threads, and holds size much longer. Chip weld is minimized.

Try *Electrolyzed Taps* on your work under your own operating conditions. See what they'll do for you in terms of cleaner threads and more holes at lower cost.

Quality and performance can't be talked into a tap; production costs can't be lowered by words. Use alone will prove that you can get three times as many cleaner threaded holes with an *Electrolyzed Tap*. Some users tapping brass or aluminum are getting ten times as much performance.

Think what this can mean to you in terms of increased production and lower cost per threaded hole.

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Electrolyzed Taps are sold only through top grade mill supply distributors. Let us give you the name of the one nearest you and mail you our Bulletin containing complete information and prices on all styles and sizes of *Electrolyzed Taps*.



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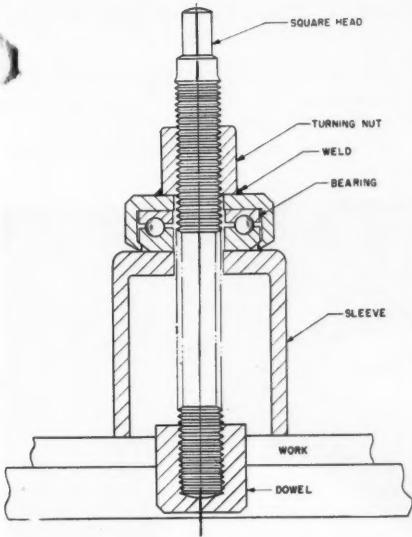
Electrolyzed TAP CORPORATION
 148 WEST RIVER STREET
 PROVIDENCE 1, RHODE ISLAND

necessary to anneal the workpiece, all the operator has to do is step on the valve and keep the piece spinning until the metal has been softened sufficiently. Only a pilot light burns until the operator steps on the valve, thus preventing burning of the part.

Dowel Pin Puller

(Courtesy General Electric Company)

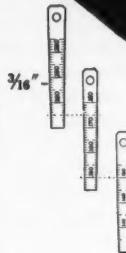
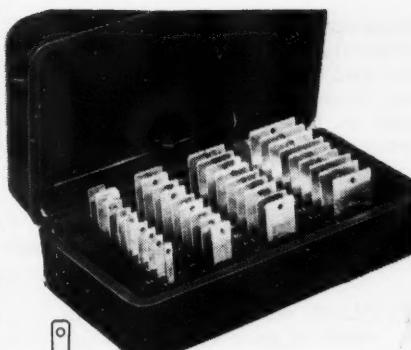
THE drawing illustrates the design of a dowel pin puller which was suggested by Samuel Solini, a G. E.



Dowel Pin Puller with Ball Bearing Nut

workman, and which is now in use at General Electric's Schenectady Works.

The feature of the tool is a nut, threaded to fit the dowel pin, which is bored to receive a ball bearing as shown in the drawing. When the nut is revolved, the thrust thus developed is taken by the bearing, which remains



**Keep track of
hole sizes as
you bore or
grind**

Now you can be sure of the exact size of trial cuts in bringing a hole up to size during boring or grinding. With a set of Moore *Direct Reading* Leaf Taper Gages, any hole size can be measured in infinite increments from .095" to 1.005". Simply insert the gage in the hole and read its diameter directly from the gage.

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stationary. Friction which would otherwise be developed between the nut and the sleeve is eliminated, making it easy to exert a strong and steady pull on the dowel pin and reducing wear on the working parts.

Speeding-Up a Power Press

By ROBERT MAWSON

I CAME across a shop recently in which a slow-acting power press had been converted, at a small expense, to a high speed production machine. The machine, which was a Manville No. 5 press, was equipped with a belt drive. The pinion gear indicated at A in the accompanying illustration, showing the location of the original drive, is 7 in. in diameter and was designed to drive gear B, which is 30 in. in diameter and which, in turn, drove the ram of the press as origi-

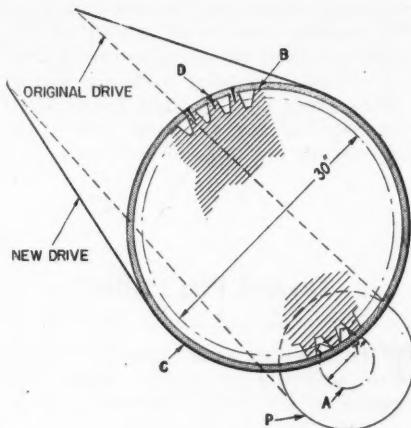


Illustration Showing a Method for Speeding Up a Power Press

nally built. The press was designed to operate at a speed of 55 strokes per minute.

The Company had several produc-

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SPRINGFIELD 7, MASSACHUSETTS

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CP UNIVERSAL ELECTRIC SCREW DRIVERS

From the large line of CP Universal Electric screw drivers you can select a size or model exactly suited to your needs.

CP Electric Screw Drivers are designed for the production line, in all types of plants—automobile, auto truck, auto body, airplane, boat and ship building, railway car shops and in radio, cabinet and furniture manufacturing.

Available with either positive clutch or cushion clutch. Many models can be fur-

nished with a reversing switch, especially adapting them for disassembling and assembling knock-down shipments; side handle and angle type screw drivers to meet special working conditions.

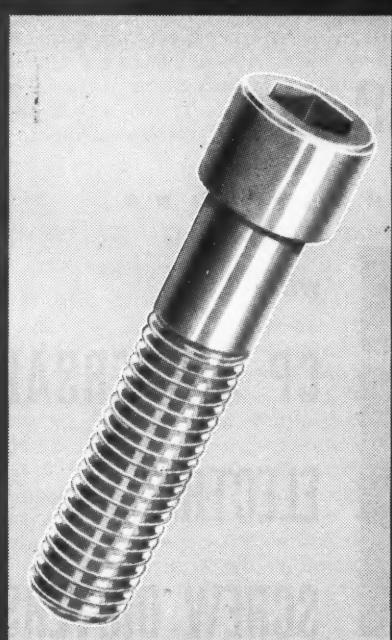
Write for Catalog 899, which gives specifications of fifty-eight CP Universal Electric Screw Drivers, for all kinds of wood and machine screws.



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tion jobs which could be performed more readily on a press that operated at a much higher speed. In order to speed up the press, the changes described herein were made.

The combination pinion gear-shaft-drive pulley P was removed from the machine. A double thickness belt 5 in. wide, shown at C, was wrapped around the gear and anchored in place with flat head screws D. The screws were threaded into the teeth of the gear, enough screws being used to hold the belt securely.

Gear B has a 5-in. face. The belt-covered gear, now converted into a pulley, is driven by belt from the original countershaft, thus providing a direct drive to the press. This simple and inexpensive method of conversion increases the speed of the press to approximately 120 strokes per minute and enables the Company to perform high production jobs at a greatly reduced manufacturing cost.

When it becomes necessary to use the press for heavier, lower-stroke jobs, it is an easy matter to remove the screws, slide the belt from the large gear and replace the pinion drive. The machine is now in its original form and ready for service on the heavier jobs.

Sheet Metal Crimping Tool

(Courtesy Glenn L. Martin Company)

A N ingenious device with which sheet metal up to 16-gauge may be crimped either at the bench, on the job or after installation, has been perfected by Frank Lucarelli, Tool Designer of The Glenn L. Martin Company, Baltimore, Maryland. The tool will work equally well on straight-edged metal, sheets or pieces curved to any shape, on the inside of blanked-out holes or wherever crimping on sheet metal may be required.

In its general shape, the tool is not

Let the chips fall where they may!

Even in the best regulated plants, chips have been known to fall, liquids to drip and particles to drop. It makes no difference to this great new Delco general-purpose motor. The top half is completely enclosed—the interior completely protected against just such occurrences.

Outside and inside, this motor is really new. Its better ventilation

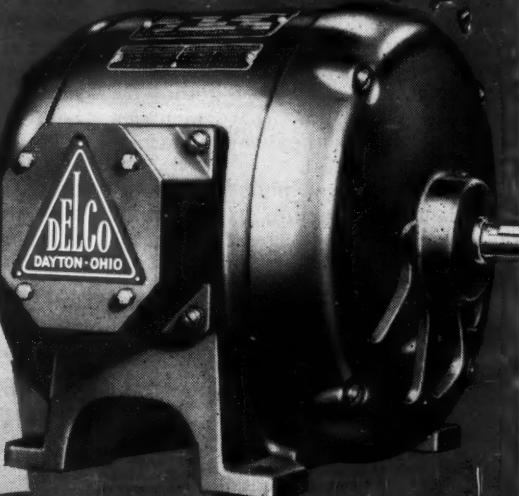
and insulation, simpler maintenance requirements and all-round greater efficiency reflect some very significant General Motors research in materials and methods. And it's really a *general-purpose* motor, too—with varied torque and starting specifications to meet a wide range of industrial applications. Complete data and delivery schedules on request.

New DELCO GENERAL-PURPOSE MOTOR

8 GREAT FEATURES

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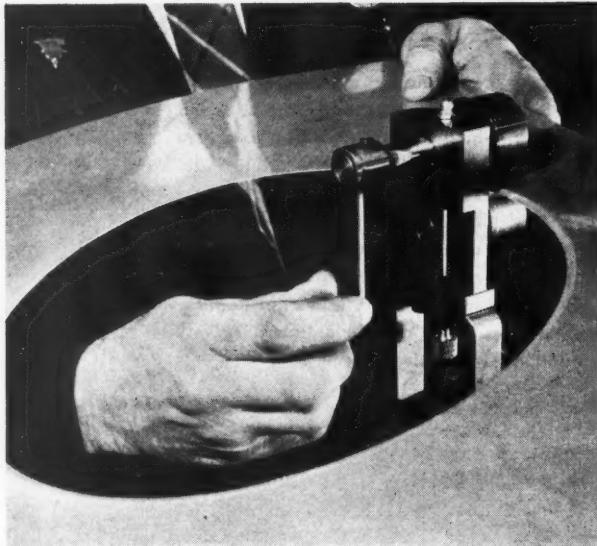
1. Complete top-half enclosure for interior protection.
2. Shielded and sealed type ball bearings.
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4. Extra-large conduit box with minimum overhang—usable in four positions.
5. High-grade carbon steel shaft ground from center.
6. Rotor and shaft assembly dynamically balanced.
7. Four classes of torque and starting specifications.
8. Available horsepower ratings conforming to NEMA frame sizes 203 through 365.



DELCO
DIVISION OF GENERAL

DELCO
PRODUCTS

MOTORS
MOTORS CORPORATION



Showed in operation is the new tool developed by Frank Lucarelli, tool designer at The Glenn L. Martin Company, for crimping sheet metal up to 16-gauge on the job or after installation. The tool is applicable to any job where crimping is required.

unlike the familiar can opener attached to the kitchen wall or the tool used by shoemakers to crimp pieces of leather together. Two round dies, one with a projecting edge and the other rounded to fit, are held together by spring tension and a screw which can be adjusted to set the dies for various thicknesses of metal.

Turning a crank pulls the metal sheet between the dies. Held firmly against a guide, the edge of the metal is crimped to the desired shape. But little physical strength is required for

the operation; certainly no more than to open a can of food in the kitchen, and the time saved is at least half as compared with any other hand tool designed for the same job.

The tool may be operated by clamping it to a bench vise. By substituting a wheel for the conventional handle (with little sacrifice in leverage) it also can be used right on the work-piece after it has been installed in the airplane, or a new crimp can be put into a piece of sheet metal without having to remove it from the ship.

Ratchet wheels may be installed in the device so that there is no slipping because, being small and handling only the thinner sheets of metal, the gears will not unmesh sufficiently to become separated.

One of the most important factors

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INTERNAL THREADING
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For holes from $\frac{1}{8}$ " upwards, 15 different sizes. The accurate thread angle is maintained through each sharpening until tool is entirely worn down. Small head-long cutting surface for regrounding.

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Profitably Used For:

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TWO NEW OPTIONAL FEATURES AVAILABLE

1. Vertical Lift Door—Counter weighted for ease of operation—con-serves heat where door need not be fully opened to enter or remove work. Supplied in place of standard hinged hearth door at \$20.00 additional to regular furnace prices shown below.



AVAILABLE IN TWO SIZES

| Type | Chamber Capacity | Amps 115 V | Watts | Amps 230 V | Price |
|------|------------------|------------|-------|------------|-----------|
| MH-3 | 8" W 6" H 14" L | 29.6 | 3400 | 14.8 | \$146.00* |
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*Includes Hearth Plate

MAX. SAFE TEMPERATURE—Continuous operation, 1750° F.; Intermittent operation, 1850° F.

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2. Heavy Gauge Steel Stand—For ease of installation and operation—locates furnace at most convenient operating height and provides additional working and storage space. Add \$35.00 to regular furnace prices shown below.



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is that of safety. In previous methods of hand crimping, a tool was used that looked somewhat like an oversize pair of pliers and which was literally pulled around the edge of the metal by sheer strength. Having no stationary guide, the device did not always produce a satisfactory crimp. It also was dangerous, as the tool sometimes slipped off and a nasty gash in the operator's arm resulted. This hazard is eliminated in the Lucarelli device.

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METAL LATHERS'
BENDER

This machine will bend up to $\frac{1}{2}$ " square or round iron, $2\frac{1}{2}'' \times \frac{1}{2}$ " channel iron, $2\frac{1}{4}'' \times \frac{5}{16}$ " flat iron cold. Weight 40 lbs.

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DRILLING AND
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Checking Length and Skew

By W. L. MONTOTH

Westinghouse Electric & Manufacturing Co.
East Pittsburg, Pa.

A DEVICE which enables an inspector to check motor frames or other small cylindrical workpieces for length and skew is shown in Fig. 1. The device consists primarily of two

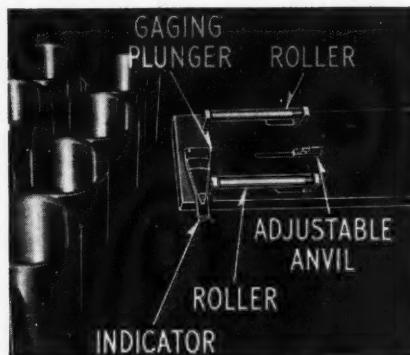
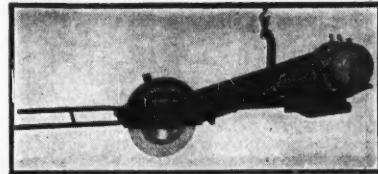


Fig. 1—Device for Checking Length and Skew of Cylindrical Workpieces

rollers, an adjustable anvil, and an indicator. A pin gage or inside micrometer is used to set the adjustable anvil and indicator to the desired length. The motor frame or other cylindrical workpiece is then positioned on the

MUMMERT-DIXON SWING FRAME GRINDERS



Sizes 12", 14", 16", 18", 20" and 24" wheels.

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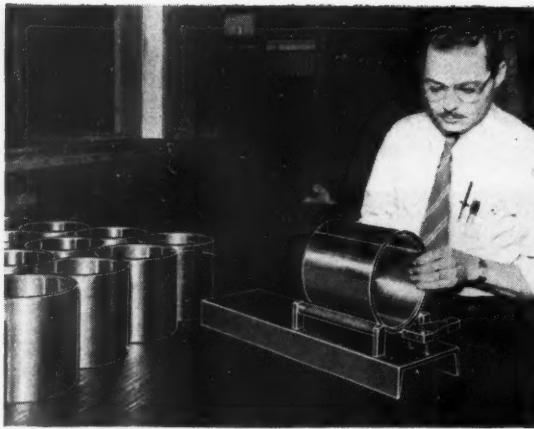


Fig. 2—Illustration Showing Use of Device for Checking Length and Skew of Cylindrical Workpieces

two rollers, as shown in Fig. 2, in which position it may be revolved freely. One end of the workpiece is located against the anvil, the indicator gaging plunger bearing against the other end.

As the workpiece is revolved on the

rollers, the indicator will show any existing skew and at the same time indicate the length. Tolerance limit lines on the face of the indicator show whether or not the length is within the required limits. The previous method of checking workpieces of this type involved the use of micrometers to check the length, but no provision was made to check the skew. This new method of checking practically eliminates the scrapping of workpieces during assembly; thus considerable savings are made in material and labor costs.

LEIMAN BROS. PATENTED ROTARY VACUUM PUMP PRESSURE BLOWERS, GAS BOOSTERS and COMPRESSED AIR MOTORS

VACUUM
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THEY TAKE
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Complete
Motor Driven
Units or
Bare Pumps

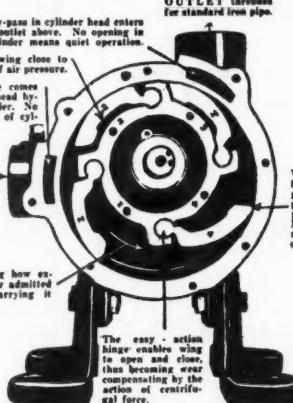
Air from cylinder through by-pass in cylinder head enters this slot on its way to outlet above. No opening in curved inner surface of cylinder means quiet operation.

Enclosed slot in piston holds wing close to cylinder at top, preventing loss of air pressure.

Air coming in at inlet at side comes through this slot into cylinder head bypass and thence into the cylinder. No opening in curved inner surface of cylinder means quiet operation.

INLET threaded for standard iron pipe.

Direction of rotation showing how extended wing carries up the air admitted at inlet each revolution carrying it around to the outlet.



Wing and cylinder surfaces become hard and glassy-like, insuring a perfect fit and positive sealing action. No composition tips to require renewal frequently.

PRESSURE
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Another New Product

WELDON STUB ARBORS

for use with WELDON
type HOLDERS



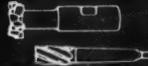
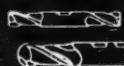
Representing a new development, WELDON Stub Arbors are specially designed to be used in place of the longer, unwieldy, conventional type of milling machine arbors. They can be handled with greater ease and convenience. At the same time the initial cost is less.

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Through a special process of grinding from the hardened solid, Bath taps are made—and they are not excelled for accuracy.

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Less SET-UP TIME



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... FOR YOUR PUNCH PRESS WITH THESE DICKERMAN FEEDS

These accurate, automatic feeds require no connection with the power shaft of your punch press. They save labor time and material waste, both for day-in-and-day-out production and on short runs.

**Hitch and Die Feeds for Automatic
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The Dickerman Hitch Feed
1. Feeds from any position on any style die.
2. Saves time on both long and short runs.
3. Offers positive feed control, adjustable from 0° to its limit.
Made in two sizes, 2" and 4" Feeds
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The Dickerman Die Feed
1. Handles coiled stock up to $\frac{3}{16}$ " thick, widths up to 4".
2. Adjustable from 0° to its maximum feed length in increments of .001".
3. Fasten three screws — and it's mounted on your die set.
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News of the Industry

"Quality Control" Course University of Iowa October 15-25, 1946

An intensive ten day course in "Quality Control By Statistical Methods" is announced by Dean F. M. Dawson of the College of Engineering and Chairman of the Committee on Quality Control and by Dean Earl J. McGrath of the College of Liberal Arts at the State University of Iowa. The course will be given October 15-25 inclusive at Iowa City, Iowa.

This is the fourth course offered by the University of Iowa. A feature of the proposed course is the follow-up program in which two 2-day clinics will be held with the industrial representatives to discuss common problems and to obtain additional information.

The program will consist of a series of conferences, lectures, and laboratory periods lasting from 8:30 A. M. to 5:00 P. M. each day except Sunday. General lectures will be given to the entire group. The trainees will be divided into small sections under the direct supervision of an instructor to facilitate the discussion of specific problems and the working of laboratory exercises.

The course is designed for executives and persons in an advisory position where the knowledge gained can be applied immediately. It is particularly valuable to quality control supervisors, managers, industrial engineers, production engineers, designing engineers specifying manufacturing limits, persons in charge of specifications for materials and persons responsible for incoming materials.

Those desiring to submit nominations for themselves or for representatives of their organization to attend the course in October or those interested in additional details should write directly to either Professor Earle L. Waterman, College of Engineering, or to Professor Lloyd A. Knowler, Department of Mathematics, State University of Iowa, Iowa City, Iowa.

AMA Industrial Relations Conference, Boston, Oct. 8 and 9, 1946

A conference of industrial relations executives to evaluate current trends in labor relations and personnel administration in the interest of increased labor-management cooperation will be held in Boston, October 8th and 9th under the sponsorship of the Personnel Division of the American Management Association.

Particular attention will be paid to trends in collective bargaining and a complete session will be devoted to a "preview of tomorrow's collective bargaining" at which both labor and employer spokesmen will be heard.

The conference will be held at the Hotel Statler, and is open to members and non-members of the Association.

National Tool & Die Manufacturers Will Meet

The next Annual Meeting of the National Tool and Die Manufacturers Association will be held at the Congress Hotel, Chicago, Ill., October 23rd to 26th. All manufacturers of special tooling, including non-members as well as members, are invited to attend.

Sessions will be held Thursday and Friday, 24th and 25th, and a dinner-dance with floor show will be held on Friday evening.

S.E.S.A. Meets Dec. 9, 10 and 11

The annual meeting of the Society for Experimental Stress Analysis will be held at the Hotel New Yorker, New York City, December 9, 10 and 11, 1946. The program will include a Symposium on Telemetering of Aircraft Flight Observations. Inquiries should be addressed to the Society for Experimental Stress Analysis, P. O. Box 168, Cambridge 39, Massachusetts.

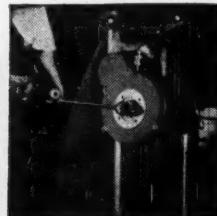
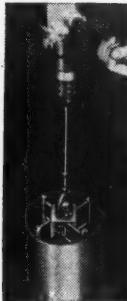


Hone Cylinders from 2" to 14 1/2" in Diameter with Low Cost SUNNEN Portable Cylinder Hones

For small lot production, for repair, salvage or maintenance of operating equipment, Sunnen Portable Cylinder Hones can be carried to the job and require only reasonable skill to produce holes that are accurate within .0005" with as fine a surface finish as is required.

Removes as little or as much stock as required for selective fitting of parts. Driven by portable electric or air drills—or may be used in a drill press, radial drill or lathe. Guaranteed accuracy, .0005"—corrects errors of out-of-round and taper. Can be operated in any position without misalignment.

For complete information on internal honing problems, call in a Sunnen engineer—or write for free bulletin.

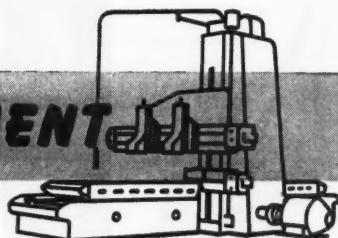


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SUNNEN PRODUCTS COMPANY
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NEW SHOP EQUIPMENT



Cincinnati Filmatic 4-Inch Plain Hydraulic Grinding Machine

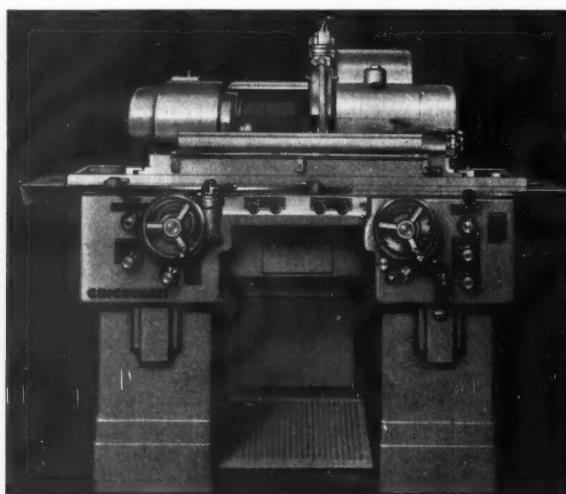
Designed for precise center-type grinding operations on small diameters, the Cincinnati Filmatic 4-inch Plain Hydraulic Grinding Machine built by Cincinnati Grinders, Incorporated, Cincinnati 9, Ohio, can be provided with "hand" or "automatic" type hydraulic infeed mechanism which afford the machine unusually high productive capacity for either traverse or infeed types of operation.

The bed of the machine is a strongly ribbed one-piece casting of box-type construction. The hydraulic oil compartment is integral with the base, completely sealed against entrance of dirt or grit. The coolant reservoir in an adjoining compartment provides a large area of heat transfer between them to effectively dissipate much of the heat

generated in the hydraulic circuit. A large volume coolant settling basin in the reservoir compartment permits the grit and metal particles to settle out before overflowing into the reservoir, and may be removed from the bed for efficient cleaning.

The table ways on the bed are of generous proportions to assure low unit pressure and are automatically lubricated with filtered oil under pressure. Both hand and power operated table traverse are supplied. Hand traverse has a two-speed arrangement to permit rapid positioning for set-up purposes, or slow hand adjustment for shoulder grinding. Power table traverse is hydraulically actuated and rates are infinitely variable from 3 to 280 inches per minute under control of a single selector knob. An independent truing rate of 3 inches per minute is selected by pushing the rate selector knob inward, thus permitting the grinding wheel to be trued without disturbing the traverse rate setting.

A single lever control starts the power table traverse, and, in addition, simultaneously starts the headstock rotation and coolant flow. The direction of table motion is controlled by a two-position reverse lever which may be operated by hand or by adjustable trip dogs on the front of the table. Dog-operated table reverse is said to be accurate within 0.001 inch. Dog-controlled table reciprocation may be ac-



Front View of Cincinnati Filmatic 4-Inch Plain Hydraulic Grinding Machine

complished with a stroke as short as $\frac{1}{8}$ inch to create an effect similar to grinding wheel spindle reciprocation, or, in conjunction with the automatic pick-feed mechanism, to simulate infeed grinding on short work.

The table may be made to tarry or dwell from 0 to 5 seconds at each reversal under the control of a single, infinitely adjustable selector knob.

The hand traverse handwheel becomes inoperative and remains motionless when power traverse is engaged. The standard headstock supplied is of the dead spindle type and is individually motor driven. A V-belt spindle drive assures smooth rotation. The enclosed motor is carried on a vibration-proof, hinged type mount with a rapid, one-hand positioning knob to simplify speed changes and belt tension adjustments. Instant stopping of spindle rotation when motor stops is provided by a spring-actuated, shoe type brake, which remains engaged at all times when spindle is not running. A single release knob permits the brake to be released momentarily or "locked-out" if desired.

When a d.c. motor drive is used, headstock speeds are infinitely variable under control of a three-step V-belt drive in conjunction with a rheostat. A live spindle headstock is available for jobs which require this style of drive. This headstock may be provided with draw-in collets or a chuck. An adapter plate permits a center to be mounted when necessary.

The footstock of standard machines is provided with combination lever and screw-type retraction of the spindle. An automatic, hydraulically actuated unit can be applied to the footstock of machines equipped with hydraulic infeed mechanisms. This attachment advances and retracts the center in synchronization with the operation of the infeed cycle.

The grinding wheel spindle is mounted in "Filomatic" bearings which are said to assure absolute dead-center rotation of the spindle and are self-adjusting for load variations to permit heavy stock removal or fine finishes to be attained with equal ease. The spindle bearings are completely submerged in oil at all times and are protected from accidental neglect by a float-actuated switch which shuts off the grinding wheel drive motor before the oil level falls too low. The grinding wheel mount and the driving sheave are exceptionally close to the front and rear bearings respectively to provide maximum rigidity.

Two V-belts transmit power from the motor to the spindle. The sheaves have four grooves in two diameters and the



JOHNSON HI-SPEED No. 130A for LOW COST HEAT TREATING HIGH SPEED STEELS



4-Burner
\$295.00

6-Burner
\$325.00

F.O.B. Factory

Firebox
7 $\frac{3}{4}$ " high
13" wide
16 $\frac{1}{2}$ " long

Write for
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A large sized toolroom unit for quick, accurate heat treating high speed steels and cutting tools. Reaches operating temperature FAST to save time and gas. Counterbalanced door opens upwards. Insulating refractory lined. 4-Burner unit delivers 1400 to 2350° F. to heat treat ANY steels. 6-Burner unit operates between 1800 to 2400° F. for high speed steels exclusively. Complete with Carbofrax Hearth, G. E. Motor and Johnson Blower.

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571 E Avenue N.W., Cedar Rapids, Iowa

Please send FREE JOHNSON Catalog.

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Rear View of Cincinnati Filmatic 4-Inch Plain Hydraulic Grinding Machine

belts can be readily shifted from one diameter to the other. This arrangement permits the grinding wheel speed to be increased at the 13-inch worn wheel diameter (new wheels are 16-inch diameter), thereby maintaining efficient

grinding action. After the belts have been changed to the high speed drive for worn wheels, a safety interlock prevents the operator from mounting new wheels on the spindle until the belts have been changed back to the proper step on the pulley.

Standard machines are provided with automatic pick feed for traverse grinding and hand cross feed of the wheel head unit for set-up adjustments. The infeed handwheel, equipped with a micrometer dial graduated in increments of 0.001-inch diameter reduction, traverses the wheel head 0.060 inch per revolution. Fine cross adjustments of the wheelhead are made by pulling outward the handle portion of the handwheel, after which one full revolution of the handwheel reduces the work only 0.001 inch on the diameter. An index plate, having ten equally spaced notches into which the handle may be engaged, permits accurate reductions in work diameter of only 0.001 inch with the comparatively large handwheel movement of one-tenth of a revolution. A unique, built-in positive stop arrangement may be used to accurately limit the infeed rotation of the handwheel for accurate sizing on repetitive cuts.

An automatic pick-feed mechanism



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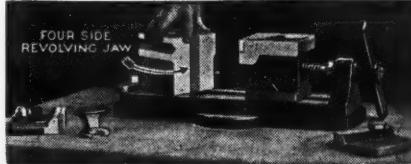


KEEPS MACHINISTS FROM WASTING TIME

You will eliminate many costly hours from your Payroll by using the JACKSON TIME-SAVING VISE. It saves the time wasted by your Machinists in hunting for Bolts, Clamps, Angle Plates, etc., when rigging up work on the Drill Press, Miller, etc. Of still greater importance is the saving in output you effect by not having your productive machine standing idle during the rigging up process, for the—

JACKSON TIME-SAVING VISE

by means of its revolving jaw and supplementary jaws instantly holds the thousands of shapes that arise in machine work.



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120 NORTH 3RD ST.

READING, PENNA.

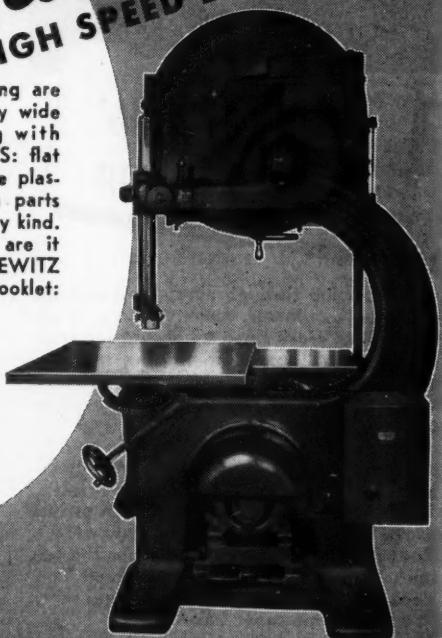
*for Sawing METAL as HARD as a FILE
or Trimming FORMED PARTS
- FAST!*

Actual photo of file
friction sawn on
Tannewitz High
Speed Band Saw.

Tannewitz

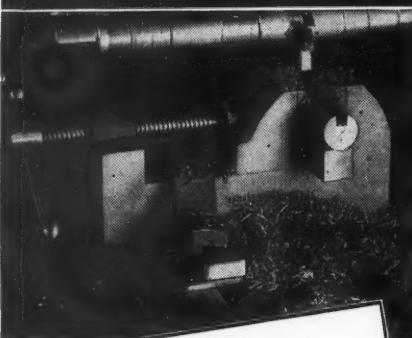
HIGH SPEED BAND SAWS

Cost reductions that are downright amazing are effected in the cutting of an extremely wide variety of materials by friction sawing with TANNEWITZ HIGH SPEED BAND SAWS: flat sheets, hardened or soft steels, armor plate plastics, and many others. Formed aluminum parts can be trimmed without using a rest of any kind. Whatever your cutting problem, chances are it can be done faster and better with TANNEWITZ HIGH SPEED BAND SAWS. Write for booklet: "FRICTION SAWING."



THE TANNEWITZ WORKS
GRAND RAPIDS 4, MICHIGAN

"YANKEE" VISES



Give
Start-to-finish
work holding

Take a job through every step without a misstep . . . faster, easier . . . in a "Yankee" Vise. Work lined up accurately from bench to drill press, to milling machine and back to bench. Lifts off and on a swivel base at the bench. Vise squared on top, bottom, sides and front end for machine work. Easily made into handy, economical jig. Hardened steel block, V-grooved, provided with each "Yankee" Vise. Four sizes, with and without swivel base . . . 1½", 2", 2¾" and 4" jaw widths. Your industrial distributor carries the full line. Write today for the "Yankee" Tool Book . . . handy tips about these and other "Yankee" time-saver tools.

NORTH BROS. MFG. CO.
Division of The Stanley Works
Philadelphia 33, Pa.

provides automatic infeed of the grinding wheel at each reversal of the table when traverse grinding. Operating parts of the pickfeed mechanism are completely built in and protected from dirt and grit, the only exposed members being a selector knob and dial and a starting button. The amount or rate of pick feed, selected by a single knob, is graduated on a dial having ten graduations, each of which represents 0.0005 inch stock removal on work diameter. The pick-feed mechanism is engaged and disengaged by means of a small clutch lever, and each new pick-feed cycle is started merely by pushing a button.

Both hand infeed and traverse grinding operations can be greatly expedited by the addition of a hand hydraulic infeed attachment, which provides a rapid, hydraulically actuated advance and retraction of the wheelhead unit, adjustable from $\frac{1}{8}$ to 1-inch stroke, under the control of the cross feed handwheel. Plunge-cut jobs occurring in large quantities can best be performed with a completely automatic infeed cycle, provided by the addition of an automatic hydraulic infeed attachment. With either the hand hydraulic infeed or the automatic hydraulic infeed, the starting and stopping of headstock rotation and coolant flow is automatically synchronized with the infeed cycle.

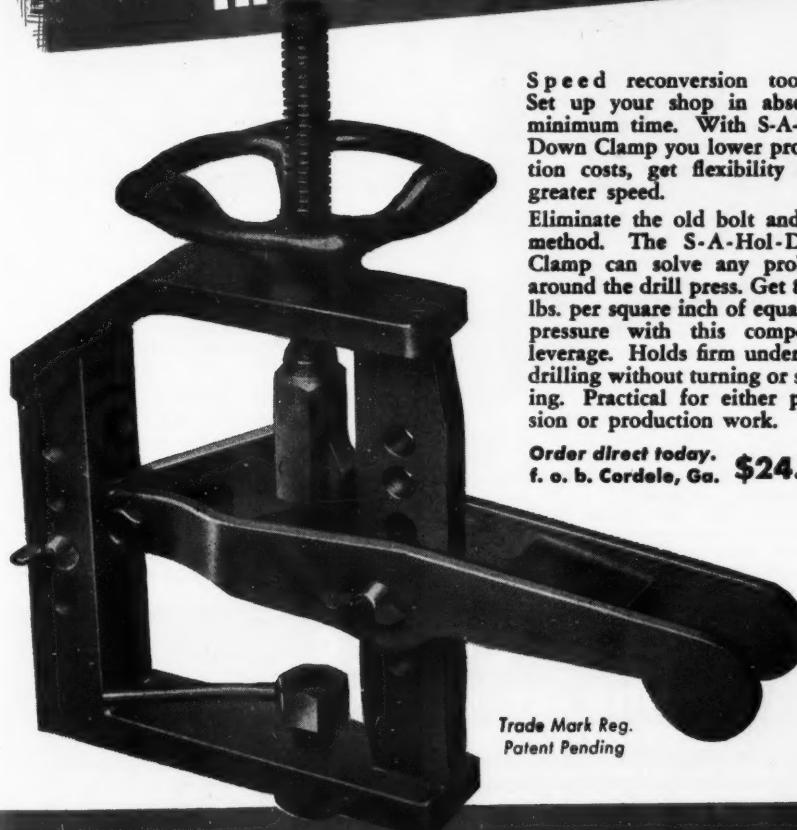
All power-operated mechanisms of the machine are automatically lubricated or submerged in oil. Oil and coolant tanks are easy to fill and special attention has been paid to the convenient location and adequate size of cleanout openings. The hydraulic unit, including both hydraulic and lubricating pumps, filters, relief valves, and pressure switches, are externally mounted beneath a cover at the rear, easily accessible for adjustment or servicing. Leveling jacks are built into the machine base to simplify the accurate leveling of the machine. Unit type construction is employed so that any unit can be dismantled without affecting the others. Hydraulic units are connected by means of junction blocks and plates and can be completely removed from the machine without having to disconnect a single pipe or tube.

The machine is available in 4 x 12 and 4 x 18-inch sizes, net weights being 3,600 and 3,700 lb. respectively.

Oilgear Type "XP" Vertical Pull-Down Broaching Machine

Five sizes of a vertical pull-down broaching machine, varying in normal pulling capacity from 5 to 37½ tons and

S-A-Hol-Down Clamp Secures Work Pieces in Record Time!



Speed reconversion tooling.
Set up your shop in absolute
minimum time. With S-A-Hol-
Down Clamp you lower produc-
tion costs, get flexibility with
greater speed.

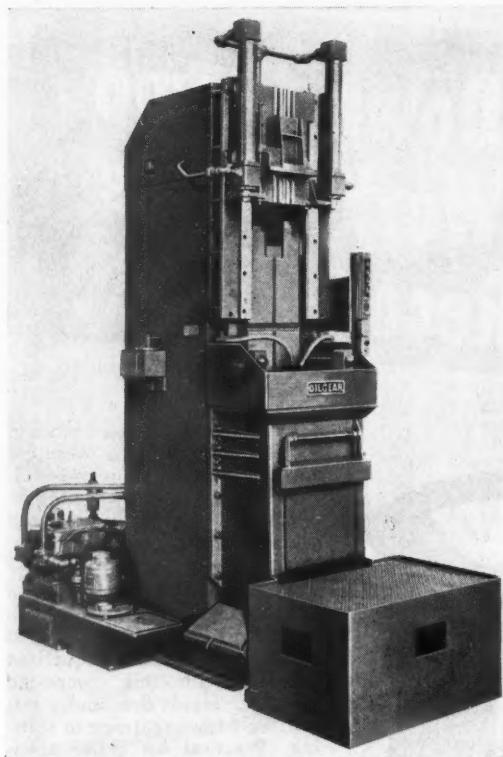
Eliminate the old bolt and bar
method. The S-A-Hol-Down
Clamp can solve any problem
around the drill press. Get 8,000
lbs. per square inch of equalized
pressure with this compound
leverage. Holds firm under fast
drilling without turning or shift-
ing. Practical for either preci-
sion or production work.

**Order direct today.
f. o. b. Cordele, Ga. \$24.50**

Trade Mark Reg.
Patent Pending

HARRIS FOUNDRY & MACHINE CO.
BEAUFORT, CORDELE, GEORGIA

**Oilgear Type XP 10x30-Inch Stroke
Vertical Pull-Down Broaching
Machine**



broaching strokes from 24 to 66 inches, are being offered as standard equipment by The Oilgear Co., 1301 W. Bruce St., Milwaukee 4, Wisconsin.

Outstanding features of the machine, which is designated as the Type "XP," include automatic tool-handling mechanisms with adjustable bracket for

tools of varying lengths; automatic puller operation; dual safety push-button control with selector switch for manual or semi-cycle operation; Oilgear regenerative stabilizing circuit; interlocked operation of tool-handling carriage and tool-pulling slide; automatic pressure lubrication of toolslide, carriage and ways; positive lubrication of work and tools; knee bar emergency stop; motor-driven cutting fluid pump, and Oilgear controlled fluid power operation.

Each size of machine is equipped with an Oilgear Type "DX" two-way variable delivery heavy duty radial piston fluid power pump arranged for direct drive and of sufficient capacity to provide variable broaching speeds up to 30 feet per minute and independently variable return speeds up to 80 feet per minute. Preset relief valves built into the pump are said to protect work, tools, pump, and machine against overload.

When broaching, the operator merely loads and unloads work and depresses the simple dual safety push-button control. In operation, the upper carriage and tools descend to insert tool shanks through work and table into pullers, the main slide automatically pulls the tools downward through the work and stops, work is unloaded, operator depresses push-buttons, main slide and tools return upward, upper carriage receives tools and lifts them upward to loading

LUERS

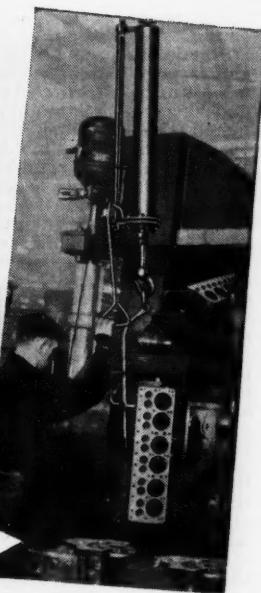
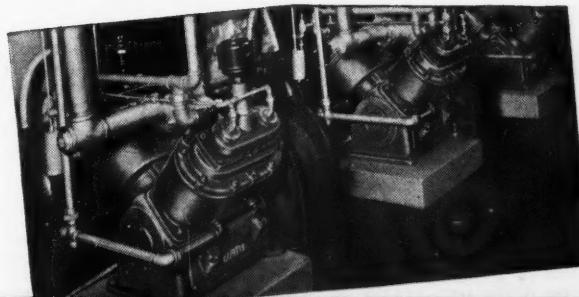
PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.

Produced under License Issued by John Milton Luers Patents Inc.



REDUCE LABOR TIME—
CUT PRODUCTION COSTS

with **CURTIS**
AIR COMPRESSORS
AND AIR HOISTS →

With an adequate, economical supply of air from a Curtis Air Compressor, you can easily speed up production by using today's many air-operated tools and devices. Precision-built Curtis Compressors offer you maximum capacity per dollar of first cost—highest mechanical efficiency—maximum air delivery per unit of power input—low-maintenance expense.

Curtis Air Hoists provide a simple, accurate, low-cost method of performing almost any lifting or handling operation in your plant. They are stepping up production, saving time, labor, and cutting costs in many industries today. Simple in construction, Curtis Air Hoists are immune to abuse from overloads and can be operated by unskilled labor. They are light in weight and provide finger-tip, one-man control of loads.

Like other Curtis products, Curtis Compressors and Hoists are backed by 92 years of successful manufacturing experience. They're built to stand up under the heaviest kind of continuous service. Write for bulletins C-4-D (Compressors) and A-4-B (Air Hoists).

CURTIS PNEUMATIC MACHINERY DIVISION

of *Curtis Manufacturing Company*

1913 Kienlen Avenue, St. Louis 20, Missouri

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Firm.....

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City..... Zone..... State.....

CURTIS

ST. LOUIS • NEW YORK
CHICAGO
SAN FRANCISCO
PORTLAND

F480

or starting position.

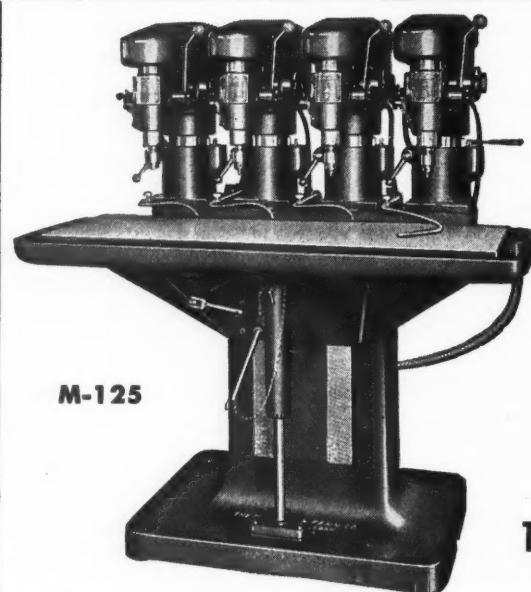
Standard equipment of the machine includes an all-steel welded frame, base, table and platform; toolslide; hardened and ground rectangular steel ways; honed steel cylinder with ground ram, bronze ram guide, molded ram packing and flanged pipe connections; tool-handling carriage with adjustable bracket; way adjustments; Oilgear Type "DX" two-way variable delivery pump with solenoid-operated pilot control and arranged for direct drive; flexible coupling; auxiliary pump with Texrope drive for operating tool-handling carriage; dual safety push-button control; selector switch for manual or semi-cycle operation; auxiliary push-buttons for inching purposes; knee bar emergency stop; pressure lubricator and reservoir; removable table; removable puller bracket; independent adjustments for varying cutting and return speeds; built-in reservoirs for cutting lubricant and power fluid; vertical motor-driven cutting fluid pump with starter switch, piping and nozzles; braced seamless steel piping with welded joints, and direct reading pressure gage. Extra equipment available includes pullers; tool-handling detents; fixtures; semi-automatic control; full-automatic control; control interlock

with fixture; electric motor; starter; mounting of starter and wiring of motor and starter through protective conduit.

Sheffield Precision Annular Form Grinder

A precision annular form grinder announced by The Sheffield Corp., Dayton 1, Ohio, utilizes the "Crushtrue" principle of wheel dressing for the rapid production of annular and cylindrical forms such as circular form tools, crusher rolls, ball bearing seals, seaming rolls, shift grooves in automotive and farm implement transmission gears, and other similar forms of intricate and precise profile.

A variable speed geared-head motor drives the work head spindle in either direction through pulleys and two V-belts over a spline shaft required for table positioning. The work head spindle may be of either live or dead center construction. The live center has provision for manual collet closing, maximum collet size 0.6875 inch. Standard work speed range is from 60 to 360 r.p.m. and may be varied in infinite increments. Addi-



M-125

**THE DRILL WITH
A HUNDRED AND
ONE SPEEDS**

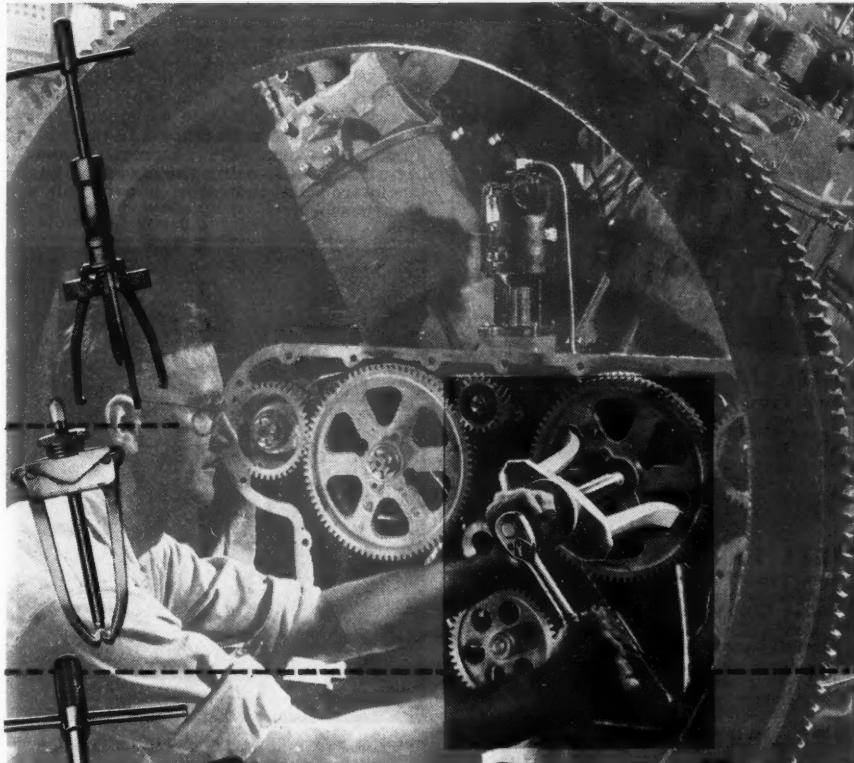
**All Speeds Instantly
Available While
Machine Is Running.**

TWO MODELS

**M125— $\frac{3}{8}$ Cap.
M96— $\frac{7}{8}$ Cap.**

**Send for Circulars
M-125 and M-96**

**THE TAYLOR & FENN CO.
Hartford, Conn.**



Snap-on Gear Pullers

give you safe, uniform power over entire



On the testing floor . . . in maintenance operations . . . wherever there is a need for gear pullers, Snap-ons are favored by men who know good tools. There are four definite reasons for this popularity: (1) Snap-ons have more "locking power" for added safety. (2) They give you a "tip-less" pull that prevents binding. (3) You enjoy smooth uniform power for easy pulling over the entire range. (4) Snap-on pullers are available in a wide range of types and sizes.

You'll like the comfortable, well-balanced feel of Snap-on pullers. They have the ruggedness and stamina that makes easy jobs

out of the tough ones. Ask the Snap-on man who calls at your plant for full details on Snap-on gear pullers or write for catalog of 3,000 Snap-on tools for industrial production and maintenance.

SNAP-ON TOOLS CORPORATION
8032-J 28th Ave., Kenosha, Wisconsin



3 NEW
Featherweight
KIPP
AIR GRINDERS

MODEL JA

(Turbine Type Tool)—
 Takes Wheels Up To
 $\frac{3}{8}$ ", Speed 50000 RPM,
 Collet $\frac{1}{4}$ ", Weight 12 oz.
 Overall Length 6 $\frac{3}{4}$ "



\$33.25
IN U.S.A.

MODEL TT

(Turbine Type Tool)—
 Takes Wheels Up To
 $1\frac{1}{4}$ ", Speed 30000 RPM,
 Collet $15/64$ ", Weight 2
 lbs., Overall Length 9"



\$44.50
IN U.S.A.

MODEL PVT

(Vane Type Tool) — A
 Power Tool For The
 Heavier Jobs Taking
 Wheels Up To $2\frac{1}{2}$ ".
 Speed 10000 RPM, Collet
 $15/64$ ", Weight 2 lbs. 4
 oz., Overall Length 9"



\$55.50
IN U.S.A.

Order Now!

You now have your choice of three
 illustrated above. All three are avail-
 able for immediate delivery and
 priced extremely low. Madison-Kipp
 carries a full line of Kipp grinder
 wheels and accessories. Order today.

MADISON-KIPP
 CORPORATION
 208 Waubesa St., Madison 4, Wis.

tional work speeds, either higher or lower, can be arranged if desired.

A hand crank engages with the lead screw and is used for table positioning. The fine adjustment knob provides micrometer control of the table position, and a table lock is said to prevent any shifting of work with respect to the wheel during the work cycle. A precision spacing attachment, using the standard gage blocks and dial indicator, is available as an accessory.



Sheffield Precision Annular Form Grinder

After the work is loaded, the operator lifts the throwout lever which brings the wheel head toward the work 0.111 inch. At the same time the coolant flows and work head revolves at the required speed. The handwheel, graduated in 0.0005-inch increments, is used to feed the wheel to proper depth. Automatic infeed cycle is available as optional equipment. Using proper wheels, a surface finish of 10 to 15 microinches RMS can be obtained using crushing as the means of truing the wheel.

"Hy-Mac" Model M-114 Die-Casting Machine

A fully hydraulic, self-contained, pressure die-casting machine for zinc, aluminum, and brass alloys is announced by Hydraulic Machinery, Inc., 12825 Ford

Wickman BRINGS YOU New Efficiency in SHARPENING CARBIDE TOOLS

Wickman-Neven Bench Grinder has special 1 h.p. motor, giving ample power for full use of diamond wheel. Permits unlimited frequency of spindle reversal.

Wickman-Neven STEEL-BONDED Diamond Wheel is practically indestructible; can't be damaged even by plunging sharp-pointed carbide tool into it.

Coolant pump provided, with reservoir in base of machine.

Table (8" x 12") is quickly set at any angle from 5° above horizontal to 15° below.

Wheel guard can be swiveled to right or left. Covers entire wheel except face in use.

THIS ENTIRELY NEW COMBINATION —

(1) the extra-durable Wickman-Neven STEEL-BONDED diamond wheel, and (2) the compact, powerful Wickman-Neven Bench Grinding and Lapping Machine—provides unequaled speed, safety and economy in off-hand grinding all single-point carbide tools. Check the features outlined above, and consider the practical benefits they'll bring to YOUR shop or toolroom.

Complete specifications on request.

Immediate Delivery!

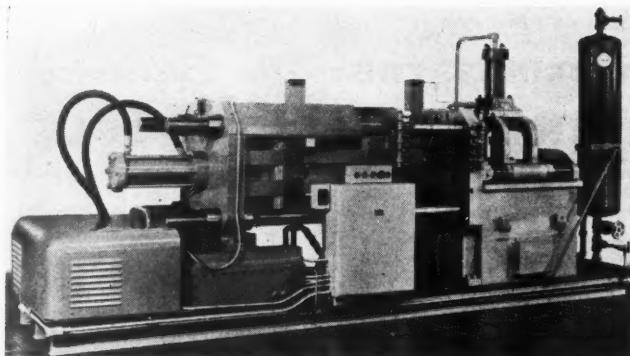
| | |
|---|----------|
| Grinding machine complete with Wickman-Neven steel-bonded plain cup diamond wheel, 6" diam. x 1 1/4" hole x 5/8" rim | \$395.00 |
| Wickman-Neven replacement wheel | \$157.00 |
| Net to User | |



15533 WOODROW WILSON AVE.
DETROIT 3 • MICHIGAN

A. C. WICKMAN (CANADA), LTD., P. O. BOX 9, STATION N, TORONTO, ONTARIO

"Hy-Mac" Model M-114
Die-Casting Machine



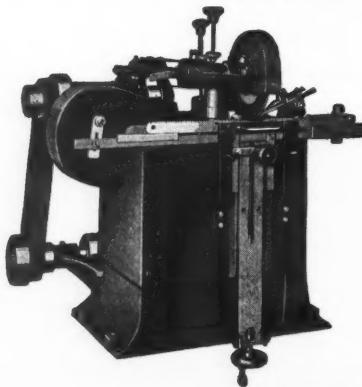
Rd., Dearborn, Mich. Designated as the "Hy-Mac" Model M-114, the machine is furnished complete with heating unit for metal, electric motor, valves for water lines, oil pump unit, filters or strainers in lines where necessary, and shutoff valves at important places in oil and water lines.

A simplified arrangement is provided for installation of the plunger without bolts or other loose parts. An improved

sures, it is claimed.

The furnace is designed so as to reduce heat loss to minimum. Oil, electric, and other lines are enclosed but are readily accessible. Safety arrangements are included for operating valves and shot cylinder. Special provisions are made so that flow of water through all water lines is visible to operator. All oil and water lines and connections are leakproof throughout.

Saw Blade Replacements-- are a fraction of usual number



THE **WARDWELL**

MANUFACTURING CO.
3166 Fulton Road, Cleveland 9, Ohio

Time and again the EC all purpose metal cutting hack, band and circular saw grinder has paid for itself within a year following its installation.

Not only do blades last longer but experience has shown that when a tooth is ground with the EC combination grinder, it will take a maximum bite with minimum destructive effect on tooth. Cutting time is cut to a minimum. Write for EC Bulletin.



You can take these
curves at top speed
when you grind with

3M BACKSTAND BELTS

Curved surfaces can be ground and finished just as readily as flat, with 3M Backstand Belts and 3M Contact Wheels. The even cutting action of these belts and the cushioned action of the wheel enable you to turn out perfectly blended finishes, free from waves and flat spots, at production line speed. Ask your 3M Distributor for a demonstration of this faster finishing method.



MINNESOTA MINING & MFG. CO.

THE 3M COMPANY

SAINT PAUL 6, MINNESOTA

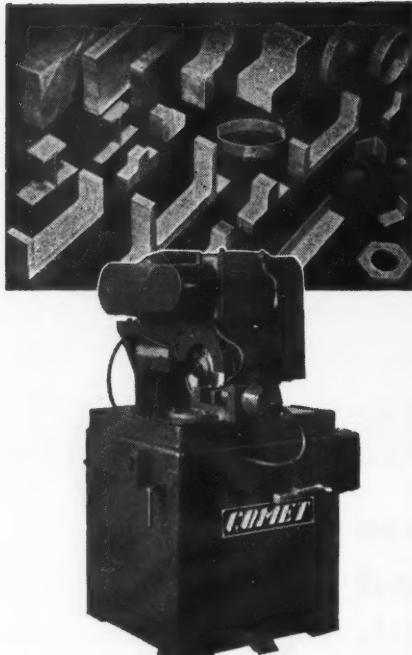
MMS1046

Please send us a copy of your booklet, "Step Up Production with 3M Method of Grinding and Finishing".

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Address _____

City _____ Zone _____ State _____



CUTS METAL FASTER *More Accurately*

If you require accurate, high-speed cutting of non-ferrous metals and other materials, here is your machine. Cuts by smooth, fast, milling action. Pneumatic hydraulic feed is coordinated with speed of cutting blade. Vise synchronized with action of ram. No vibration because of weight distribution. Has 4 speed transmission and variable feed mechanism. Built-in coolant system. Properly operated, blade breakage is eliminated. Write or wire for free literature.

CONSOLIDATED MACHINERY & SUPPLY CO., LTD.
2031 SANTA FE AVE., LOS ANGELES, 21, CALIF.

COMET
AUTOMATIC CUT-OFF MACHINE
MODEL MH

A "Deoxidizer," which is standard equipment on zinc alloy machines, reduces dross to a minimum. Die plates are designed so that dies can be clamped on firmly, even under unusual conditions. Moreover, a device is provided for quick installation of the nozzle. A complete unit (with cold chamber arrangement into which the metal is ladled) is available for high pressure die casting of aluminum and brass alloys.

The Hy-Mac Model M-114 Die-Casting Machine is so constructed that in a very few hours the "hot" or furnace end can be interchanged for either zinc or aluminum and brass alloy production. All operating levers and valve mechanisms are within easy reach of the operator.

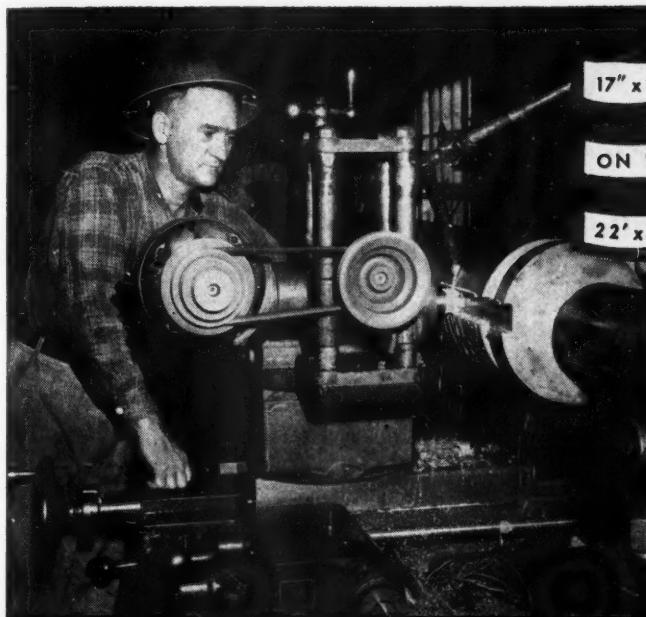
Principal specifications of the unit are as follows: size of die plates (center to center of bars), 24 x 24 inches; size of die plates (between bars), 20 x 20 inches; die opening 10 inches; die space, maximum 28 inches, minimum 12 inches; pressure per square inch on metal, zinc 6,000 lb., aluminum and brass 16,000 lb.; locking pressure, 400 tons; oil pressure, 1,000 lb.; size of motor, 7½ h.p.; floor space, 54 x 180 inches; approximate weight, 16,000 lb.; diameter of tie bars, 4 inches; capacity of melting pot, zinc and brass 500 lb., aluminum 200 pounds.

Mabor Non-Overheating Solvent Degreaser

The Mabor Co., Walnut St., Clark Township, N. J., has developed a production degreasing machine that utilizes a liquid jacket heating system which operates at atmospheric pressure. In this manner, gentle, uniform heat is provided, thereby avoiding the danger of the solvent overheating and reducing the necessary amount of fluid in the equipment, the manufacturer states.

The Mabor Non-Overheating Solvent Degreaser can be heated with high pressure steam without the use of a pressure-reducing valve, or with gas or electricity without any possibility of overheating the solvent, it is claimed. The degreaser is also equipped with an automatic control system that preheats the circulating water above the dew point. An automatic oil and grease skimming device included as standard equipment is so designed as to require no attention. According to the manufacturer, distillation is handled in the equipment completely without danger even when the last drops of solvent are being distilled.

The Mabor Degreaser can be readily



17" x 2½" x 1¼" KEYWAYS

ON BOTH ENDS OF A

22' x 9 7/8" O.D. SHAFT

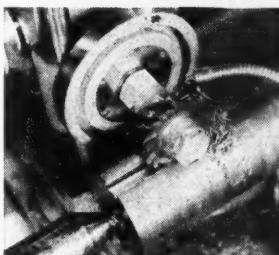
**THIS
MOTOR-
DRIVEN
UNIT**

does it on a

LATHE
without
changing
the set-up

MASTER LATHE CONVERTER

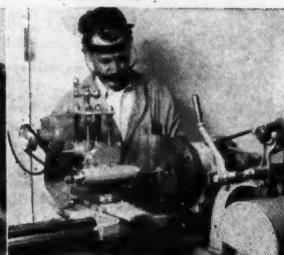
Save set-up time; save shut-downs. Any work-piece (up to the capacity of your lathe) can be milled, ground or bored. Interchangeable heads and universal adjustments make the Master Lathe Converter the most versatile machine tool in your shop.



SIDE MILL used with basic mill-unit. A 1" keyway ½" deep in a 4½" O.D. shaft cut is 1½" per minute.



External Grinding Head (adjustable to all angles) provides additional operations for your lathe.



Internal Grinding Head using a 1" wheel for grinding bore in heat treated die.

3 Sizes for Lathes 9" to 60" swing — \$245 up.

MASTER MANUFACTURING CO.
1307 AVENUE A • HUTCHINSON, KANS., U.S.A.

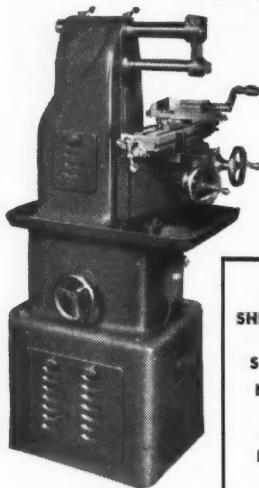


Now Available

Coming off the new production lines in Chicago, the SHELDON-built SHELDON-Vernon Precision Machine Tools* are now available at the same moderate prices that made them first in the moderate priced field. Built in the new modern SHELDON plant which is equipped with every advanced machine tool building facility, they are better than ever—even more accurate, more rugged and better finished.

Lighter and smaller and less costly than machine tools of equal accuracy, they provide a faster, more convenient and economical means of doing all but the heaviest operations.

Write for Bulletin on:

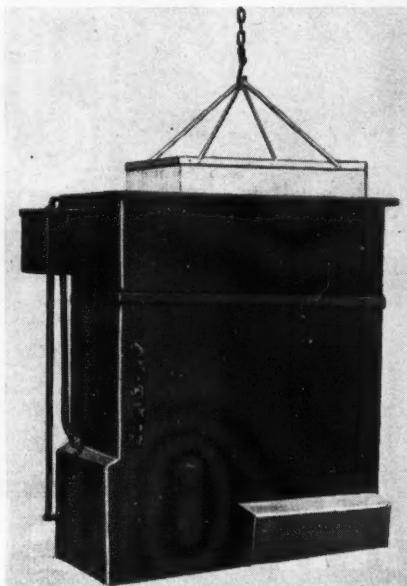


See the new
SHELDON Machine
Tools at
Space No. A183
National Metal
Congress
Atlantic City
Nov. 18 to 22

Builders of Good Lathes Since 1919

SHELDON MACHINE CO. Inc.
4260 N. KNOX AVE., CHICAGO 41

installed by simply connecting the heat and water lines. The unit is equipped with safety controls and is built in many standard sizes, with custom-built units being available for vapor, vapor spray,



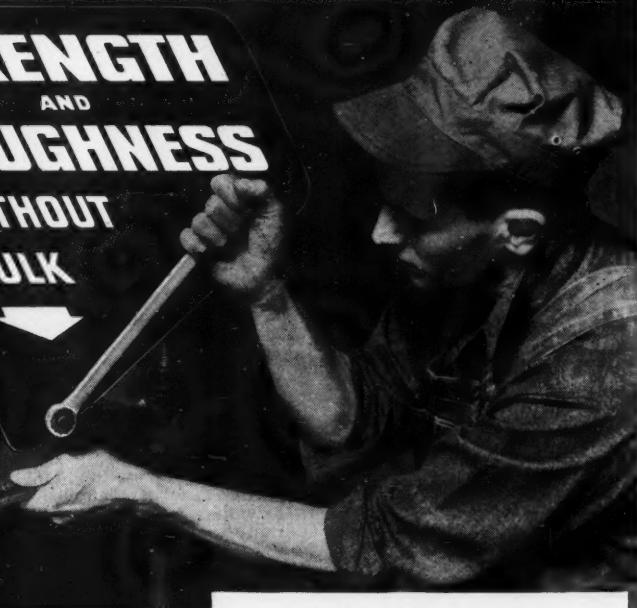
Mabor Non-Overheating Solvent Degreaser

and liquid vapor. In addition, conveyorized machines in any size can be built for any kind of cleaning requirement.

Leiman Sandblast Cabinet with Combination Loading Door

A feature of the Leiman Sandblast Cabinet illustrated herewith, product of Leiman Bros., Inc., 138 Christie St., Newark 5, N. J., is the combination door and armholes with cuffs which can be readily swung wide open for the easy ingress and egress of the articles to be sandblasted, as well as for the removal and replacement of the work basket. The cabinet is a self-feeding type with sand magazine from which the sand is fed through a nozzle and onto the work, after which it is continually returned by gravity to the sand magazine to be refed to the nozzle.

**STRENGTH
AND
TOUGHNESS
WITHOUT
BULK**

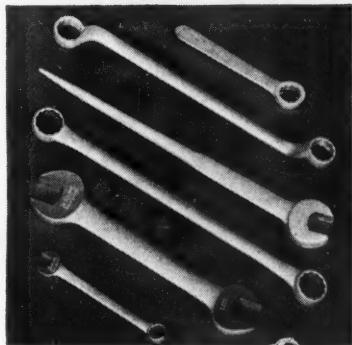


WILLIAMS "SUPERRENCHES"

● If you want the maximum in wrench strength and toughness with an absolute minimum of bulk and weight... your answer is a Williams "Superrench."

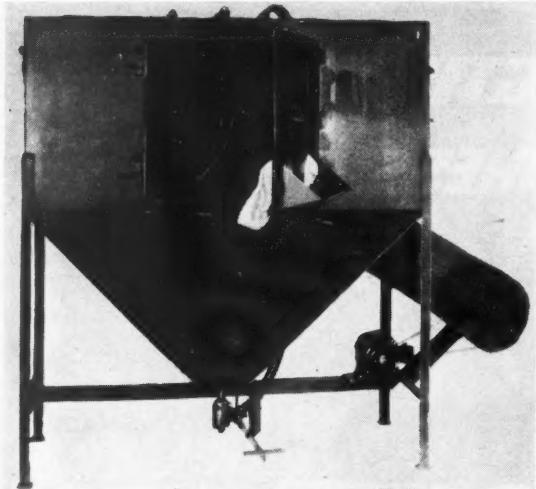
These fine wrenches are drop-forged from selected alloy steel and heat-treated, permitting trim, slim lines and exceptional balance. Made in a wide variety of patterns and sizes. Attractively finished in chrome-plate, over nickel, with highly-polished heads. Sold by leading Industrial Distributors everywhere.

J. H. WILLIAMS & CO., BUFFALO 7, N. Y.



WILLIAMS
**DROP-FORGINGS AND
DROP-FORGED TOOLS**





Leiman Sandblast Cabinet with Combination Loading Door

The Leiman Sandblast Cabinet illustrated is equipped with a motor-driven rotating tumbling basket for handling small articles such as bolts or buttons. The basket is arranged to tumble the

parts over and over as it rotates, while the nozzle continuously sprays the work mass with sand, thus producing the desired cleaning action on all sides. When sandblasting is required on larger pieces of work, the basket itself may be quickly detached and removed from the cabinet, thus making the entire interior area available. The operator then holds the large workpieces under the nozzle, turning each piece over and over until it is entirely cleaned.

According to the manufacturer, the Leiman Sandblast Cabinet provides an efficient method for the rapid cleaning of work prior to finishing, with rust, scale, and carbon deposits, as well as burnt casting sand deposits, being quickly removed.

Extension Bed Gap Lathes

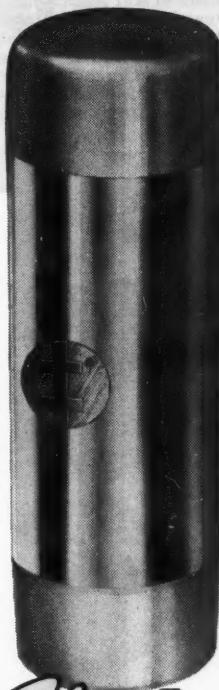


Illustrated is the Series "AG" 20/40" Extension Bed Gap Lathe. Also made in 28/50" Heavy Duty.

The Extension Bed Gap Lathe is designed to be used either as a gap lathe or an engine lathe. We also manufacture a line of regular geared head engine lathes. Write for circulars.

The Nebel Machine Tool Co.
CINCINNATI OHIO

IT'S
NYLON !



**OUTPERFORMS ALL OTHER
SOFT IMPACT HAMMERS**

Features

- Streamlined design
- Beautiful, durable finish
- Replaceable faces
- Patented lock-tite head construction

DANCO
Nylon **HAMMERS**

It's new! It's sensational in performance! It does not chip or absorb moisture. Holds its shape under constant, hard use. Has no rebound. Is resistant to fire, acids, oils. Will not mar the finest finish. By repeated tests outlasts all other "soft" materials.

Jobbers: Order this No. 1 hammer today. Immediate deliveries.

A few territories are available. Write for information.

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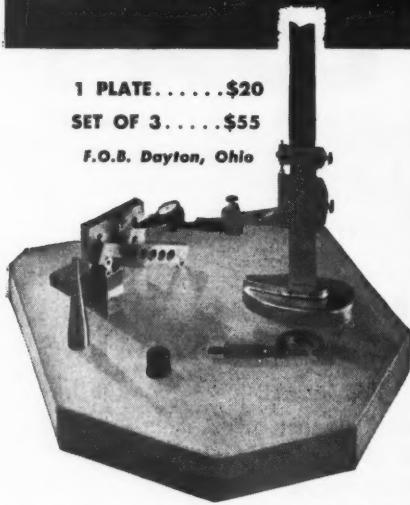


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Fellows No. 12H Lead Measuring Instrument

The Fellows Gear Shaper Co., 78 River St., Springfield, Vt., has placed on the market an instrument for checking the lead of helical gears and other surfaces. Designated as the No. 12H, the instrument, shown in Figs. 1 and 2, operates on a basic principle and incorporates an arrangement whereby the lead of a helix is checked by the continuous motion of

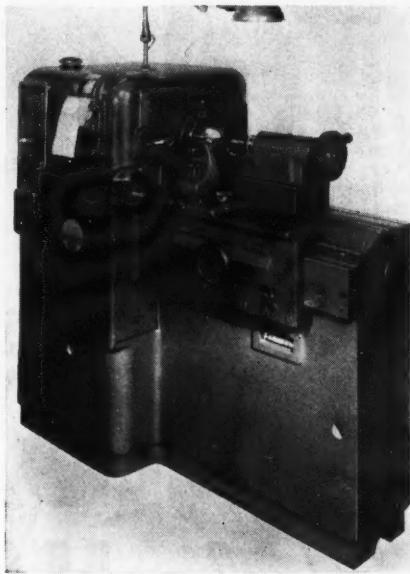


Fig. 1—Fellows No. 12H Lead Measuring Instrument with Electrical Recorder

a measuring pointer, in conjunction with the desired rotation of the work. If the work being checked is of the correct lead, then the dial indicator remains stationary. If there is an error in lead, the indicator needle indicates in 0.0001 inch the displacement of the helix in the face width being measured.

The principle comprises two tangent bars and pins, both operating slides. One of these slides effects the traverse movement of the member carrying the measuring pointer; and the other, the rotation of the work. The contact positions of the pins on the tangent bars are set by means of size blocks and micrometers, and dial indicators are provided



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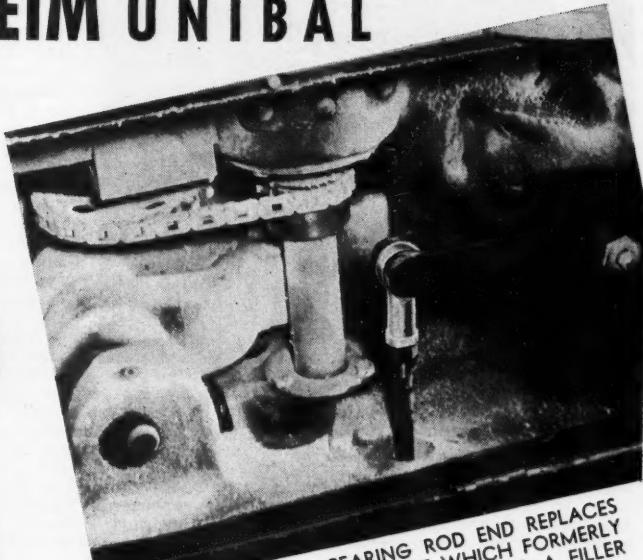
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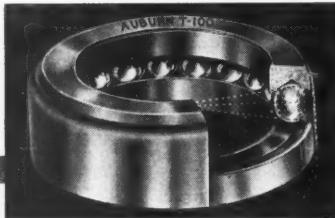


Fig. 2—Close-Up View of Fellows No. 12H Lead Measuring Instrument Checking a Right-Hand Helical Gear

electrical recorder, shown in Fig. 3, which automatically produces a record of the displacement of the tooth face on a paper chart. This ruled paper chart, as shown in Fig. 4, is provided with horizontal ruled lines, the heavy lines being $\frac{1}{2}$ inch apart and representing 0.001 inch movement of the measuring pointer. The semi-circular lines on the chart are also spaced $\frac{1}{2}$ inch apart, and these represent 0.200 inch on the face width of the gear, so that for a gear 1 inch in face width, the length of the charted line would occupy five spaces, or $2\frac{1}{2}$ inches. It is possible to analyze a chart and to accurately determine the amount of displacement of the tooth face in the face width of the gear measured. The space between the individual vertical lines on the chart represents 0.0002-inch movement of the measuring pointer.

so that the setting pressure can at all times be accurately maintained. Errors in gears can be checked by using the dial indicator carried on the measuring slide, or a chart can be made for a permanent record.

An integral part of the Fellows No. 12H Lead Measuring Instrument is an

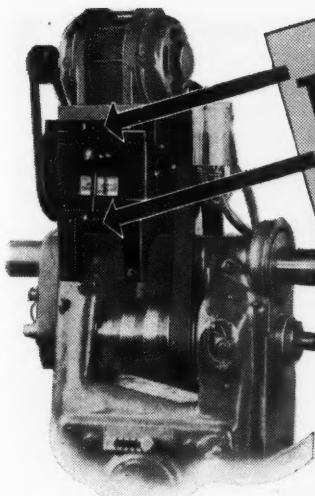


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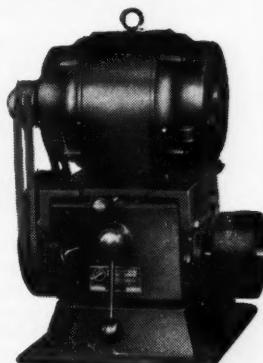
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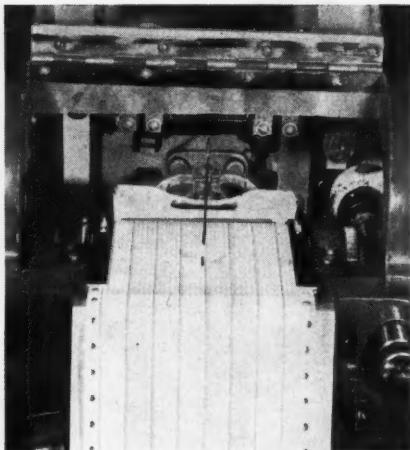
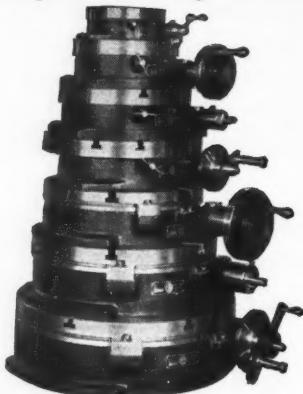


Fig. 3—Close-Up View of Electrical Recorder for Charting Errors in Lead of Helical Gears and Other Surfaces

The contact points of the pins on the tangent bars are independently adjustable, so that it is possible to have traverse of the measuring pointer without rotation of the work, and rotation of the work without traverse of the measuring pointer. This is said to great-

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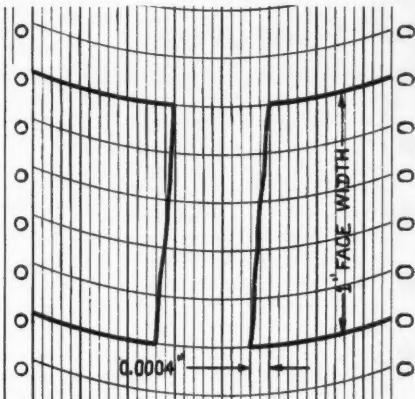


Fig. 4—Chart of Adjacent Sides of a Right-Hand Helical Gear Tooth Showing that the Gear Measured Has 0.0004-Inch Displacement in Helix in the Face Width Measured, Indicating a Short Lead

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ly increase the range of application of the instrument. In addition to checking the lead of helical gears, the instrument can also be used for checking taper and crowning of spur and helical gear teeth.

The instrument is so designed that it is easy to set up and operate and its functioning can be accurately checked. It has a capacity for gears up to 12 inches pitch diameter and a measuring slide movement of approximately 10 inches.

G-E Twin-Unit Outdoor A.C. Arc Welder

A twin-unit outdoor a.c. arc welder in a single enclosure has been announced by the Electric Welding Division of the General Electric Co., Schenectady 5, N.Y. Each of the two circuits in the welder can be used simultaneously and independently with electrodes up to $\frac{1}{8}$ inch in diameter or combined into one circuit for heavy welding with $\frac{3}{8}$ -inch electrodes. The units have a current range of from 90 to 270 amperes when used singly and from 180 to 540 amperes when operated in parallel.

Both welders are equipped with con-



G-E Twin-Unit Outdoor A.C. Arc Welder

trol which reduces the open circuit voltage to approximately 30 volts when the machine is not being used for welding, but which makes full power available the instant the arc is struck. Both halves are supplied through a single set of primary terminals, so that only one power-line circuit to the unit is required.

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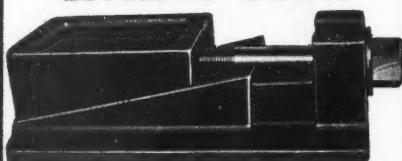
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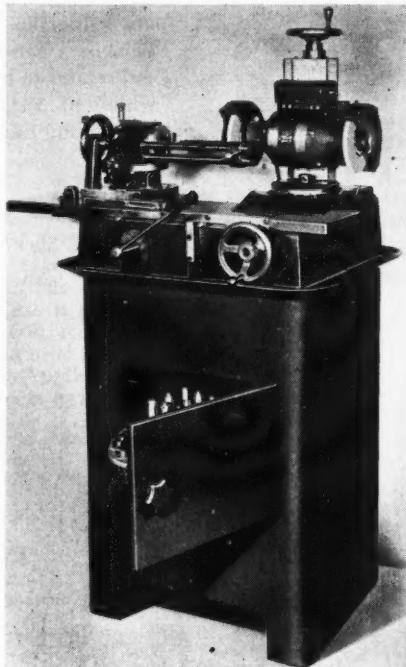
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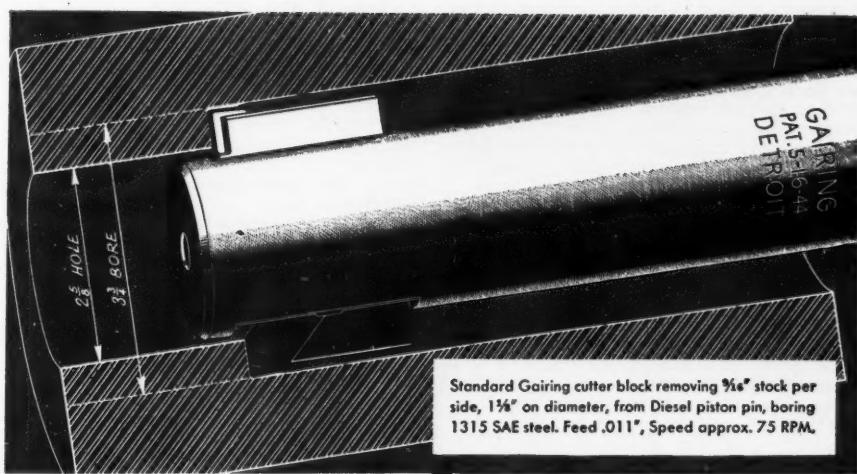
D-S Tool Grinder

A tool grinder which is designed to facilitate radial-helix relief grinding is announced by the D-S Grinder Division of Royal Oak Tool and Machine Co.,



D-S Tool Grinder

Royal Oak, Mich. According to the manufacturer, the unit provides for the radial relief sharpening right to the cutting edge with sharp intersections and no undercuts. Any desired margin can be left on blade sides. Radial and helical relief can be produced simultaneously and can be varied to meet all practical requirements.



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Gairing's Block-Type Boring Tools Save Man Hours on Production Jobs

The sturdy Gairing boring bar, not weakened by the conventional centering hole, withstands the twisting strain of heavy cutting or fast removal of metal.

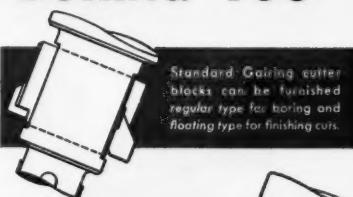
The standard block cutter, shown above, is but one of many instances where Gairing block-type boring tools demonstrated in actual production to be equally successful on roughing operations as on semi-finishing and finishing cuts.

And man hours are actually saved. Blocks are quickly and easily changed. They are pre-set to size, are always perfectly centered, eliminating the cut-and-dry method of adjustment.

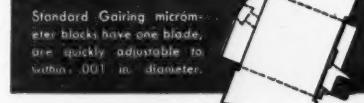
Standard and micrometer blocks are made in sizes ranging from $1\frac{1}{4}$ to $7\frac{3}{4}$ ". Larger sizes to order.

For full information request our complete Boring Tool catalog.

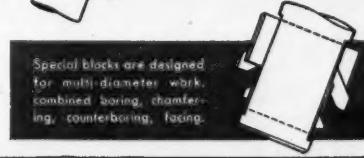
Standard Gairing cutter blocks can be furnished regular type for boring and floating type for finishing cuts.



Standard Gairing micrometer blocks have one blade, are quickly adjustable to within .001 in. diameter.



Special blocks are designed for multi-diameter work, combined boring, chamfering, counterboring, facing.



THE GAIRING TOOL COMPANY, Detroit 32, Michigan

The D-S Tool Grinder is constructed for use with cam and index plates which allow for the grinding of any tool with from 1 to 12 flutes with identical relief on each blade. The unit can be used for relieving end-cutting, form, taper, or slide-cutting tools, flute grinding, as well as circle grinding and other tool grinding operations. Tools are rigidly supported between centers or in a collet.

The D-S Tool Grinder is available in bench, floor stand, and fixture types.

RCA Electronic Power Generators

Two induction-type electronic power generators of 2 and 15 kilowatts output respectively for the precise, localized heat treating, brazing, and soldering of metals are now in production by the Radio Corporation of America, RCA Victor Division, Camden, N. J. The two generators are said to be of special importance in processes which call for accurate control of temperature and localization of heat, such as soldering, brazing, case-hardening, and tempering of metals, where quick localized heat is necessary to prevent warping and dis-

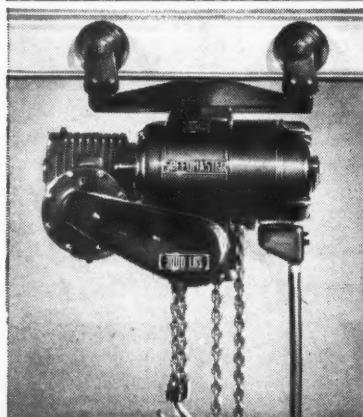
tortion of the workpiece.

Both of the RCA Power Generators are electron tube units designed for the conversion of electrical power from the commercial 60-cycle supply to a frequency of approximately 400,000 cycles per second. The 2 kw. and 15 kw. generators, designated as the 2-BL and the 15-BL, are each composed of the two units, the main generator unit and an applicator unit.

The main generator unit houses the high-voltage rectifier, the main control and protective devices, and most of the high-frequency components. The applicator unit houses the output current transformer and its associated high-frequency elements. It is connected to the main generator by 25-foot cables, permitting the location of the applicator unit in any desired working position within a radius of 25 feet of the main generator.

In the 2-BL, the high-frequency oscillator circuit employs two RCA 833-A tubes connected in parallel, operating in a self-excited Colpitts circuit. The high-voltage rectifier employs four RCA 8008 mercury vapor tubes connected for single-phase, full-wave operation.

The larger generator, the 15-BL, em-



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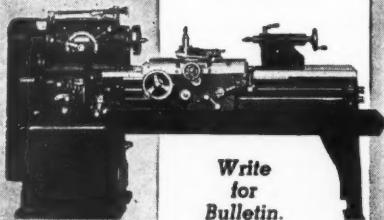
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ploys two RCA 892-R air-cooled tubes in the high-frequency section, connected in parallel and operating in a self-excited Hartley oscillator circuit. Six RCA 8008 mercury vapor tubes are connected for three-phase, full-wave operation, supplying the high-voltage direct current.



RCA Model 2-BL Electronic Power Generator with applicator unit, atop the unit, and foot switch

Output power of both the 2-BL and the larger generator can be accurately controlled over a wide range. The output or "tank" circuit components, located in the work applicator units, are connected to the generator proper by flexible coaxial cables. This circuit arrangement allows maximum working flexibility, and also permits operation with low transmission line currents, thereby minimizing transmission line losses. The primary of the output current transformer is the tank inductance of the oscillator circuit. The secondary of this transformer is a single turn of copper sheet, which is coupled to the water-cooled work coil.

Normal keying is accomplished by pressing either an "on" button or a foot



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switch, which actuates the plate-power contractor. Plate power is automatically turned off by the 0.2-120 second timer after the preset time has elapsed, or can be turned off at any desired time by pressing the "off" button. In the 15-BL, a special vacuum type relay controls a blocking voltage applied to the grids of the oscillator tubes, which permits keying speeds as high as 40 cycles per minute.

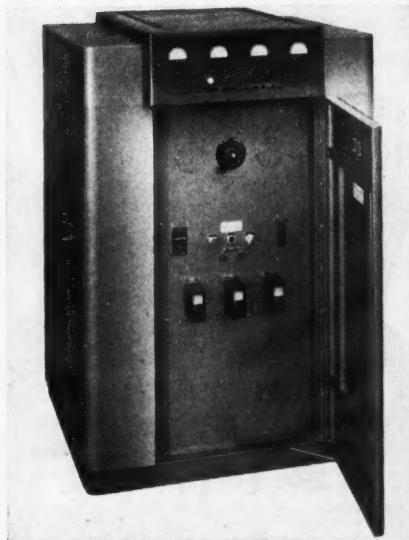
The generator unit is cooled by forced air circulation. This is accomplished by drawing air through removable filters mounted in the rear of the lower com-

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RCA Model 15-BL Electronic Power Generator (without applicator unit)

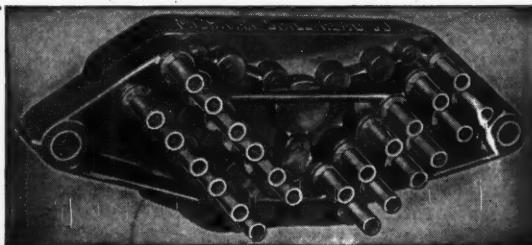
partment of the steel cabinet, passing it over the various components, and discharging it at high velocity directly on the tubes and cooling fins. Final discharge of warm air is at the rear and top of the cabinet. In the applicator unit of the 2-BL, the current transformer is cooled by air, while the work coils are cooled by tap water. In the 15-BL, all the high-frequency elements of the applicator unit are cooled by tap water. The water lines are electrically insulated from the rest of the unit by rubber hose connections, while the compartments housing the water-cooled components are sealed with

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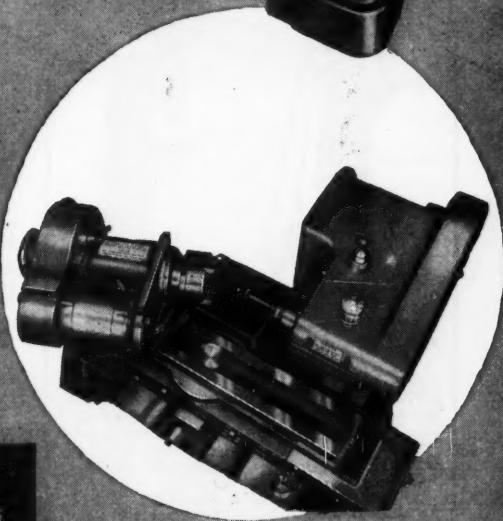
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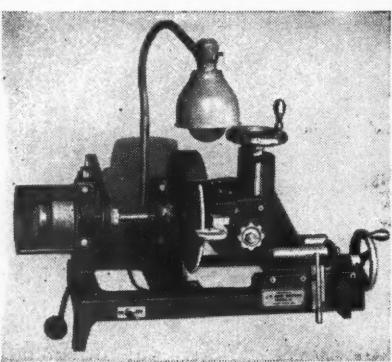
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• Pioneers in the riveting field. Head rivets from smallest to $\frac{1}{8}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave.

Neoprene gaskets in order to reduce moisture condensation on the surface of the components.

The cabinets are sturdily constructed of cold-rolled sheet steel. The 15-BL is divided internally into two compartments, with a steel partition separating the high-frequency section from the balance of the rectifier and control units. Access to these compartments of the cabinets is obtained through large doors



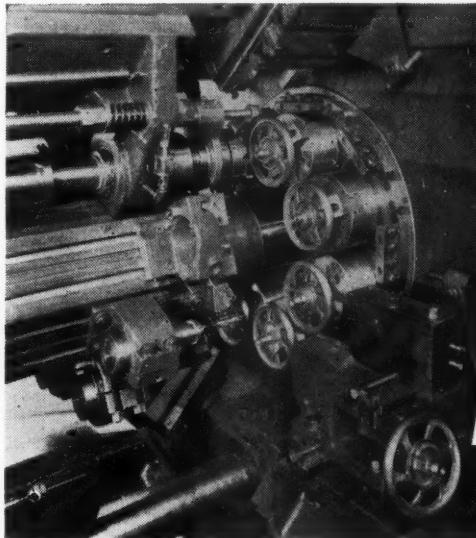
Applicator Unit for RCA Model 15-BL Electronic Power Generator

which may be locked to prevent tampering by unauthorized personnel. In the 2-BL, removable panels provide easy access to all compartments. The cabinets are finished in two-tone umber gray baked enamel, which is durable and easy to clean. The 2-BL generator unit is mounted on four sturdy casters to permit convenient handling and moving. The 15-BL is designed for fixed location operation.

"Speed-Way" Hole Locating and Drilling Machine

A machine for use in hole spacing, spotting, drilling, and inspecting is now being marketed under the trade name of "Speed-Way" by the Mid-Continent Products Co., 333 N. Michigan Ave., Chi-

PRODUCTION MACHINES THAT *Sell Goods*



Example OF MODERN COST CUTTING

This sewing machine hand wheel, of cast iron, requires 16 operations for finishing. The entire job is done on an Acme-Gridley 6" RPA 8-Spindle Chucker in 44 seconds.

Carbide tipped tools are used for the forming and turning cuts.

Two machines do this job, and fourteen other important jobs, with a simple change of tooling. That's versatility—and economy.

Respect from the Sales Department has been earned, in many a business, by Acme-Gridley 4, 6 and 8 Spindle Bar and Chucking Automatics.

These truly modern production machines turn out precision metal parts FASTER. They help keep costs down—a highly important fact in these times of advancing material

prices and higher wage rates.

The result, for the Sales Department, is either a lower selling price, to attract business, or a better margin where selling prices are standardized. Your Sales Department is interested in having you get complete Acme-Gridley information.

The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics;
1-4-6 and 8 Spindle • Hydraulic Thread
and Tap • The Chronolog • Limit Motor Starter
Centrifuges • Contract Manufacturing

cago 4, Ill. According to the manufacturer, the extreme accuracy of the machine is obtained by the use of projection magnification.

Operating in somewhat the same manner as a motion picture projector, the Speed-Way light beam is projected through a translucent grid chart and onto a viewing screen where the original image is enlarged to approximately 16 diameters. The viewing screen occupies a central position on the work table, directly in front of the operator in an easy-to-see position at all times. By following a previously prepared grid chart

layout on the viewing screen, the work, which has been positioned on the free-moving work table, can be completed

High Speed Cutting Tools

- Special high speed circular, dovetail, flat form and special tool bits.
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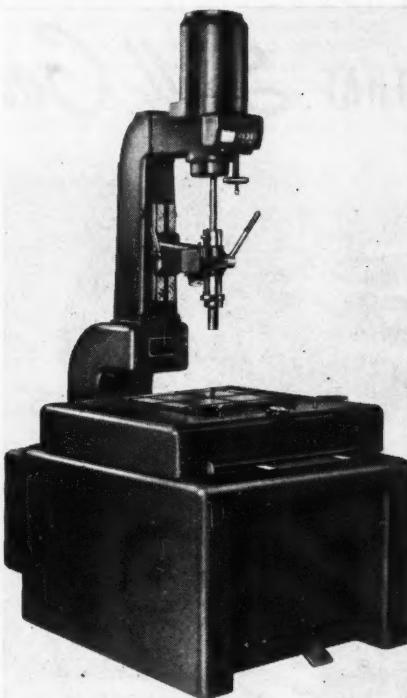


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Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send us your blue prints and inquiries.

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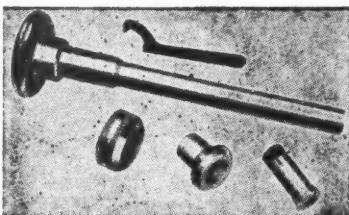
CHICAGO GEAR WORKS
440-450 N. Oakley Blvd., Chicago 12, Ill.



"Speed-Way" Hole Locating and Drilling Machine

quickly as well as accurately.

Effortless, free movement of the work table is said to be obtained by the use



COMPLETE COLLET CHUCK ATTACHMENT

Collet Closing Sleeve is hardened and ground inside and out; guaranteed to .001" accuracy. Hand Wheel is web type and completely machined. This makes a perfectly balanced and true running wheel of desired size to assure operator maximum grip. A ball thrust bearing is mounted in the hub of Hand Wheel producing easy and free operation when applying or releasing tension on collet.

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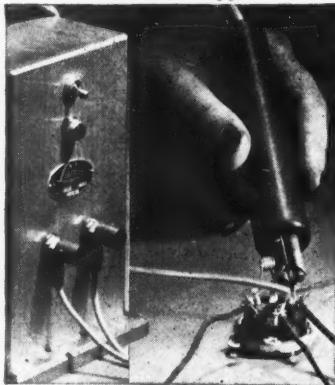
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BROOKLYN 2, N. Y.

Luma Arc Soldering Tool

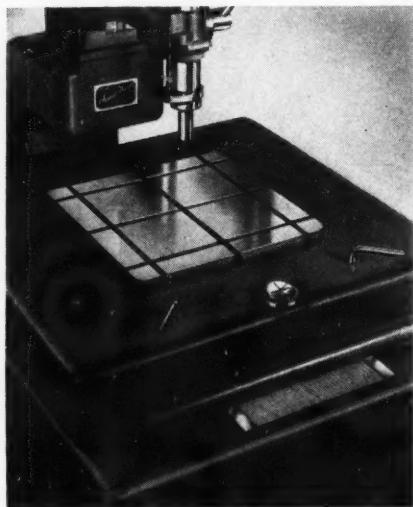
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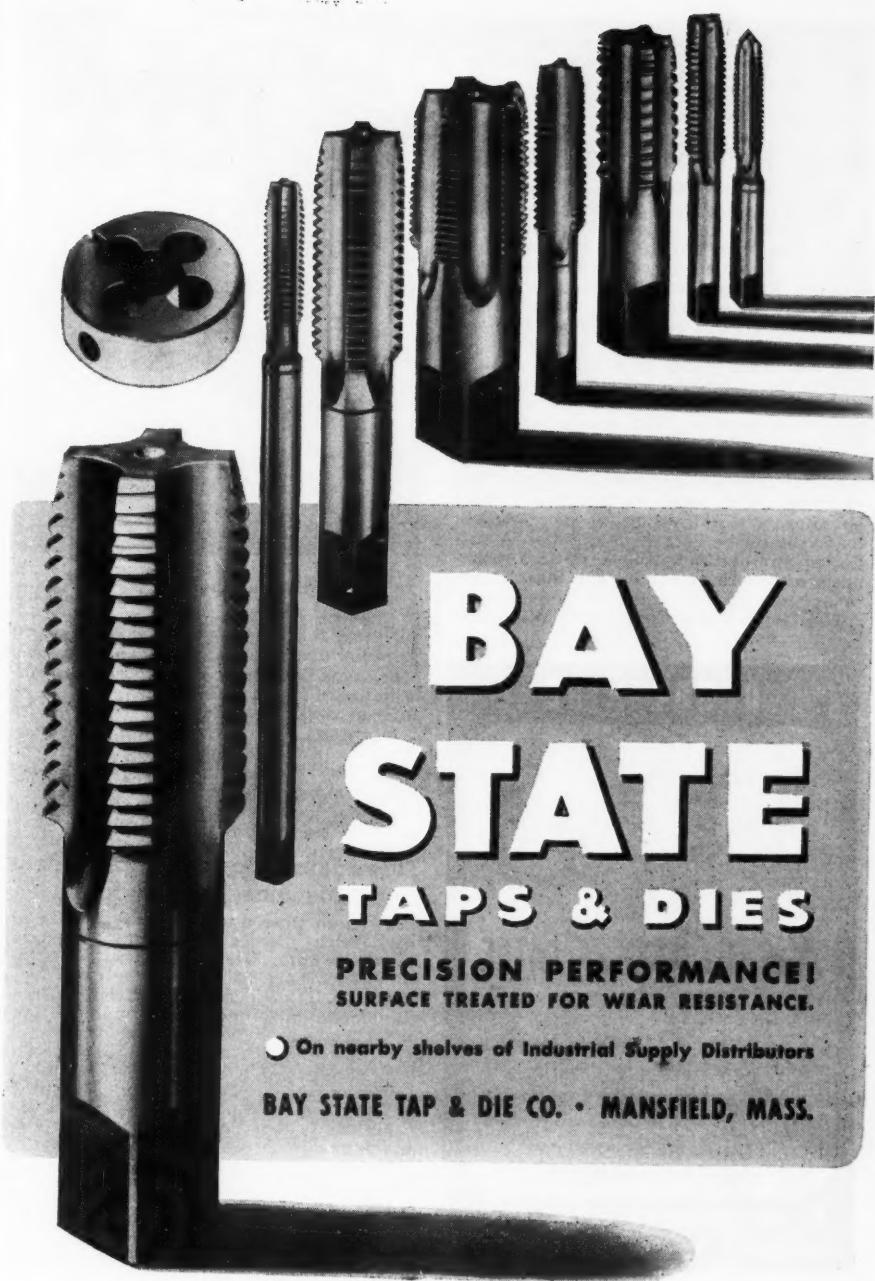
of anti-friction bearings that operate on hardened steel tracks which are arranged to allow for movement in any direction. These bearings are grease sealed, in addition to being anti-friction, thus eliminating lubrication maintenance. A slight pressure on a foot treadle releases the work table for movement; releasing the pressure automatically locks the unit in position.



Close-up view of "Speed-Way" Hole Locating and Drilling Machine showing work table, viewing screen, and grid chart

The grid charts employed are 12 x 12 inches on a plate which is 13 x 13 inches. Standard grid chart plates are graduated in $\frac{1}{16}$ -inch divisions in both directions and are said to have an accuracy of 0.001 inch in 12 inches. In addition to the standard right-angle division plate, another plate having $\frac{1}{8}$ -inch spacing of concentric circles with radial divisions of $7\frac{1}{2}$ degrees is also standard. Other grid chart plates can be supplied to meet special requirements.

The Speed-Way Hole Locating and Drilling Machine is supplied with a standard drill head to which various sizes of gages may be quickly attached for use in inspecting. For this operation, work is positioned on the table in the same manner as the setup for spotting or drilling, using the identical grid chart prepared for earlier operations. For use under a radial drill, the machine can be



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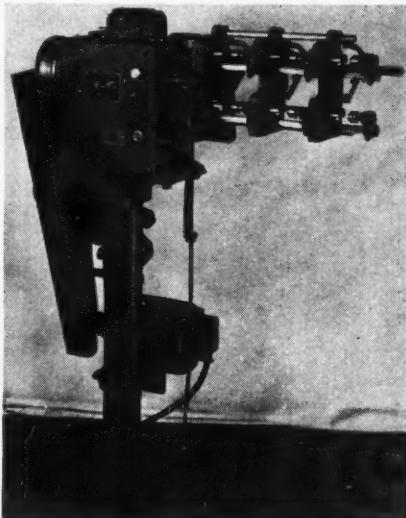
furnished without the column and drill head. The same operating principles apply to use under the radial drill as when used with the drill head.

Globe "Multi-Chuck" Coil Winder

Known as the "Multi-Chuck", a winding machine for the high production multiple winding of coils which must be wound singly is announced by The Globe Tool & Engineering Co., Davis Ave., Dayton 3, Ohio. Small solenoids, paper form and solid core relays, cross wound radial coils, and so on, are said to be wound at high speed rate by means of the machine, which is available with a selectable number of winding stations, each adding a spindle to both a "running" row and an "idle" row of spindles.

In use, the operator reloads the idler spindles while the running spindles progress through an automatic cycle. The shifting of a lever causes the reload spindles to wind while the operator reloads the formerly wound spindles. A sufficient number of stations (up to a maximum of 8) can be selected to match operator time against machine time.

The Globe Multi-Chuck Coil Winder is



Globe "Multi-Chuck" Coil Winder

designed for long life at high speed. All spindles are ball bearing mounted, and other wear points are protected with oil-less bearings. A special gear design is said to decrease noise and vibration to a minimum. For level winding, the machine is available with normal travel, while rapid traverse is available for cross-wound coils.

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| MAGNUS-ELECT | .004" | capacity to |
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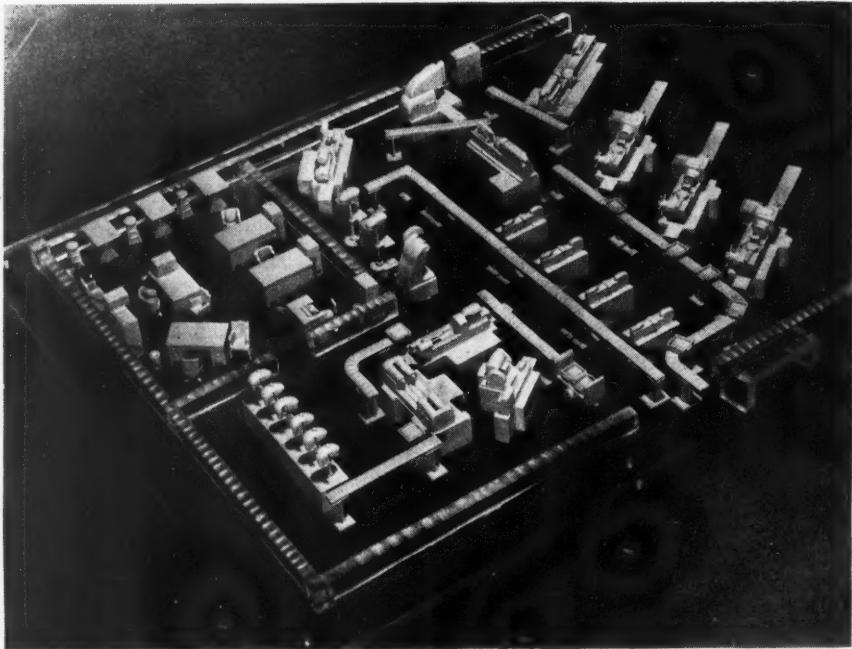
F. W. DERBYSHIRE, INC.
Waltham 54, Massachusetts

Three-Dimensional Template-Base Machine-Tool Models

To save time and likewise provide an economical means in planning industrial plant layouts, Visual Production Planning Incorporated, 101 Park Ave., New York 17, N. Y., is now offering three-dimensional template-base machine-tool models of the type illustrated herewith. Each base is cut to the overall plot-plan dimensions of the machine under maximum operating conditions. All travel affecting floor space is included in the template base. The die-cast identifying machine top is mounted on this base to provide easy recognition of the type and kind of machine tool.

Quickly arranged, the models of all standard machines and shop equipment afford a quick, accurate answer to proposed plant arrangements, eliminating





Three-Dimensional Template-Base Machine-Tool Models

time spent in drafting. Photographs of the layout can be used as working drawings and provide permanent records. The model layout permits group analyses by those untrained in the reading and interpretation of blueprints, thus bringing more ideas and better criticisms to bear on the problem, it is claimed.

In conjunction with operation sheets, time standards, and piece-rate data, the model is said to provide an exact method

of balancing production lines before any of the machine elements are rearranged. Color code systems may be visualized well in advance of changeovers. Moreover, plant safety problems may be anticipated.

Models of every type of standard machine tool, as well as such equipment as gravity conveyors, lockers, trucks, tote boxes, benches, male and female figures can be obtained. Available office plan-



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.

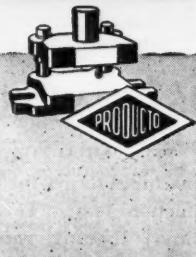
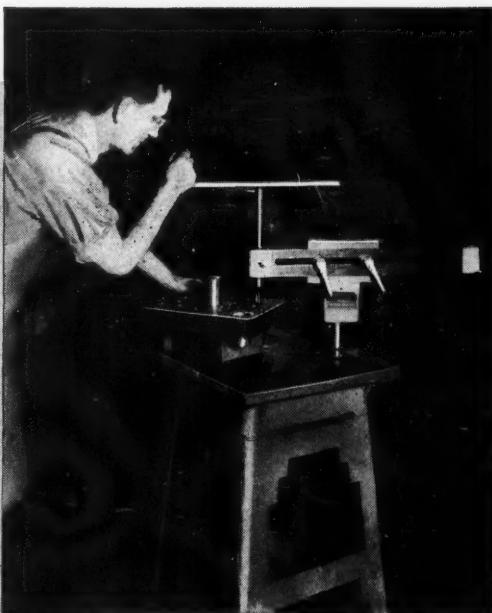


The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{1}{8}$ " to 1" diameters. Send for pricelist.

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The one machine needed in every tool, die and machine shop. Will save its cost many times over. Designed for toolroom work to close limits. Built to withstand hard shop use. Quickly adjustable to position taps at any place on table. Now made in 3 sizes... 2 bench types, capacities $\frac{1}{4}$ " and $\frac{1}{2}$ " taps; and Universal Pedestal type, capacity 1" taps. Once in your shop, you will never be without it. Write for descriptive bulletin.



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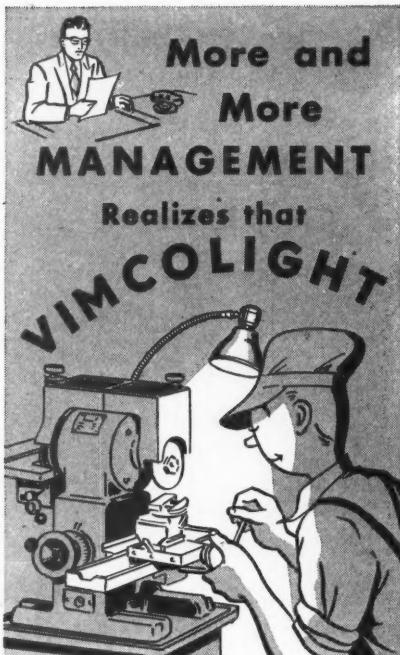
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Make VIMCOLIGHTS a part of your machines to get the most out of each production hour. This instantly adjustable direct lighting permits balanced seeing without glare . . . leaves eyestrain behind . . . results in fewer rejects.

VIMCOLIGHTS are easily mounted on any machine. Rugged construction promises long dependable service. An increasing number of manufacturers of machine tools are adding VIMCOLIGHTS as standard equipment for faster operation.

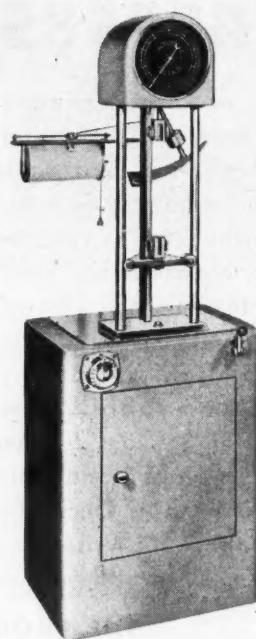
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VIMCO
MFG. COMPANY, INC. 111 BRAYTON ST.
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ning equipment, in both $\frac{1}{4}$ and $\frac{1}{2}$ -inch scales, includes all types of desks, chairs, files, and so on, necessary to complete office layout.

Dillon Low-Range Tester

Produced by W. C. Dillon & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill., the Dillon Low-Range Tester shown



Dillon Low-Range Tester

herewith is built expressly for lighter materials or small finished items. It has four separate capacities, each instantly available and individually shown on a large dial. The ranges are 0 to 10 lb. in 1-oz. dial divisions, 0 to 25 lb. in 2-oz. dial divisions, 0 to 50 lb. in 4-oz. dial divisions, and 0 to 100 lb. in 8-oz. dial divisions.

The lower grip travel of the unit is continuously variable, or stepless, from 0 to 19 inches per minute. Additional features of the tester include $\frac{1}{2}$ of 1 per



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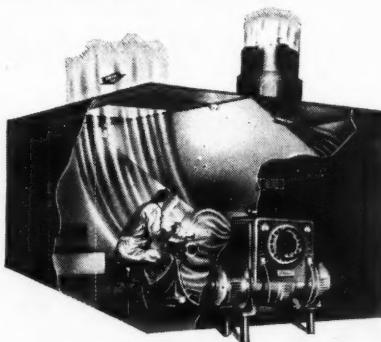
cent accuracy; pendulum action; maximum-load reading; featherweight and swiveled upper grip; stroke limiting switches; forward-reverse switch; elongation gage; stress-strain recorder, and numerous other features. The overall height of the unit is 63 inches, and the net weight is 162 pounds.

Hobart Production Welding Booth

To protect the health of and provide more pleasant working conditions for production welders is the purpose of a fresh air safety welding booth announced by The Hobart Brothers Co., Troy, Ohio. The booth, which is 9 feet wide x 9 $\frac{1}{4}$ feet deep x 7 feet high, is constructed of fabricated panels of 16 gauge sheet steel formed with companion flanges punched on 12-inch center for bolting assembly. This type of construction enables the unit to be easily disassembled for moving from one location to another if desired. The door is a sliding type with overhead track and easy running rollers, and measures 43 inches wide x 78 inches high.

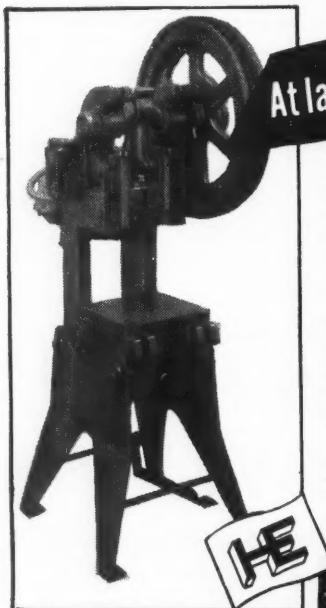
A heavy duty exhaust fan draws in fresh, cool air through an opening in the top of the booth, down past the operator

to pick up welding fumes and heat, and then expels it to the outside of the building. In this manner, the booth serves a



Hobart Production Welding Booth

double purpose in providing fresh air and comfort to the welding operator and at the same time protecting fellow workers in other parts of the plants from eyeburn and welding fumes.



20 TON CAPACITY!

3 INCH STROKE

Designed to meet war production needs, this new Highland all steel punch press is now available! Because of its long stroke, 3", and its ample shut height of 7", this punch press handles those lighter tonnage jobs which heretofore had to be run on larger presses. The new Highland inclinable punch press features a 12" x 12" bolster with a 4 $\frac{1}{2}$ " diameter plug as standard equipment, an open back, a non-repeating trouble free clutch, and heavy bronze bearings. The highly stressed parts are made of 4140 alloy steel machine finished and heat treated to optimum tensile strength. The frame is made of welded and normalized 1" steel, heavily reinforced. A slight modification in the clutch mechanism will allow for automatic operation at 120 strokes per minute. The entire press occupies approximately 3 $\frac{1}{2}$ square feet of floor space and weighs 800 lbs. (less motor).

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2800 Milwaukee Ave. **Chicago 18, Ill.**

Watson-Stillman 100-Ton Metal-Forming Press

The Watson-Stillman Co., Roselle, N.J., announces the addition of a 100-ton capacity single action press to its line of metal-forming presses. Control is provided for both manual and automatic single cycle operation with reversal by either pressure or position. Position is controlled by an adjustable slow-down device. Inching control is arranged for die setting, and the press also includes full-range adjustment control of pressing speed. The Metal Forming Press in-



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IN
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**LOW COST
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If you have a porous casting problem, here's your answer—Mogul Cast Seal, the amazing colloidal compounded of pure copper and chrome flour. Millions of minute metallic particles penetrate deep into pinhole cracks and fissures building up a bond that will last forever. Available in 1 gallon cans and 55 gallon drums.

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Watson-Stillman 100-Ton Metal-Forming Press

corporates a prefill system for a rapid traverse stroke and is equipped with a cooler for maintaining oil at the proper operating temperature. Standard equipment also includes two radial piston type pumps connected to a 100 h.p. double end ball bearing motor as a pumping unit. A die cushion is available as optional equipment.

The Metal-Forming Press has an advance speed of 775 inches per minute, pressing speed of 225 inches per minute, and return speed of 775 inches per minute.

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Six sizes, 3" to 12". Many exclusive features. You see them everywhere. Write for circular.

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RIIGHT to the right spot . . . coolants continue on their steady flow with proper viscosity and at cooling temperatures to keep work cool.

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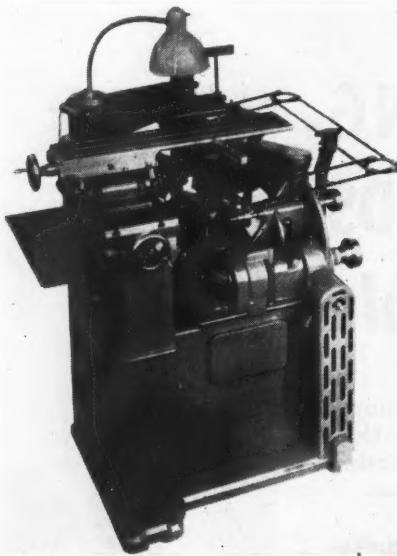
THE



Specialties Co., Inc.
BLANCHESTER, OHIO

Studer Type PSM Profile Grinding Machine

Specially constructed for grinding profiles of hardened workpieces such as profile gages, form tools, sectional dies,



Studer Type PSM Profile Grinding Machine

and so on, as used in the machine and watch manufacturing industries, the Studer Type PSM Profile Grinding Machine illustrated herewith has been placed on the market by the Cosa Corp., 5000 Chrysler Bldg., New York 17, N. Y. Flat workpieces of 2-inch maximum thickness and 5.9-inch length and circular work-

pieces of 4-inch maximum diameter can be ground. The precision attained is said to be ± 0.0002 inch.

The principle of operation consists in following the form of a template, enlarged in suitable proportion, by means of a tracer finger swiveling about its point. Linear movements are transmitted to the grinding wheel head through the pantograph and swiveling movements by turning the wheel about its cutting edge through link bars. The wheel must be shaped beforehand proportionately to the exact shape of the tracer finger point in the same ratio as template to workpiece.

The pantograph can be adjusted to any ratio required. The accurate forming of the wheel to the shape of the tracer finger point is effected by moving the latter along the edge of a hinged guide bar on the template table, which can be turned down for the purpose. In holding the tracer finger at all angles during this operation, the movements are reproduced by the wheel contacting against a diamond, which is brought exactly in line with the extended swivel axis of the wheel head by means of a dial indicator.

The diamond holder and workpiece are both fixed on a revolving table mounted on the vertical slide and can each in turn be placed opposite the grinding wheel. The stroke of the vertical slide can be set from 0 to 2.44 inches. For the grinding of clearance angles of a form tool, the latter is fixed on an inclinable workpiece rest, which is inclined to the required angle, and the template table is tilted to the same angle.

The Studer Type PSM Profile Grinding Machine is also particularly suited for the grinding of dies as used in the watch manufacturing industry. Dies are divided into several sections, the most suitable places being chosen for dividing lines, and each section can then be ground separately. By means of a circular grinding device, workpieces up to 4 inches in diameter can be ground. A special at-

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Y O H E STORAGE RACKS.
Speed up handling. Protect
stock. Furnished in capacities
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GOOD GEARS ONLY

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Wooster Pike Cincinnati, Ohio

5 EXTRA VISE VALUES AT NO EXTRA COST

Here in one Parker Vise are all the features you've ever said a vise ought to have... and for the same price you'd pay for an ordinary vise...



Photo taken in a large eastern steel mill.



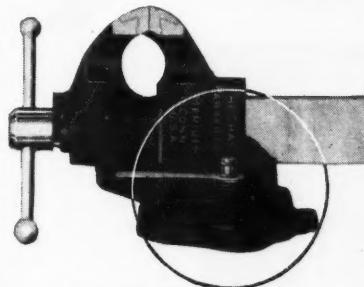
2. BRAKE TYPE SWIVEL BASE

Short swing of wrench locks a Parker Vise all the way around, auto brake fashion.



3. OVERRSIZE SCREW AND NUT

The parts that get the hardest wear in a vise are oversize in a Parker Vise and extra tough... one-piece steel screw and high grade malleable iron nut.



1. EXTRA STRONG SOLID CAST UNDERPORTION

Instead of the usual hollow type, the Parker Vise has a solid casting to withstand years of rough handling. Saddle fit.

Your distributor will welcome the chance to give you the complete Parker story. The Charles Parker Co., Meriden, Connecticut.



4. TENSION SPRING HANDLE

Screw adjusted tension spring holds the handle of a Parker Vise anywhere you want... lets you slide it easily.



5. RENEWABLE TOOL STEEL JAWS

The pinned-on tool steel jaws of a Parker Vise will wear for years. Easily replaced for years more service. Can't work loose.

PARKER VISES

America's First Vise Maker



tachment allows for the grinding of profiles up to 360 degrees. A dust exhauster, as well as balancing device for grinding wheels, can be supplied as accessories.

Spitfire Precision Flat Lapping Machine

A precision flat lapping machine designed for the high speed precision flat lapping of single parts or production runs of hardened steel, quartz, and glass parts is announced by Spitfire Tools, Inc., 2933 N. Pulaski Rd., Chicago 41, Ill. The machine is said to provide for the rapid and easy finishing of each piece to a high polish and precision flat finish and size. According to the manufacturer, a surface finish as fine as 2 r.m.s. micro-inches can be obtained. Single pieces ordinarily require no holders, chucks, or collets, the operator merely laying the piece on the revolving circular lapping plate and directing its motion with his hands. Production lapping of large quantities of small parts can be performed rapidly by the use of standard or special holders to suit the job.

The Spitfire Flat Lapping Machine can



Spitfire Precision Flat Lapping Machine

RHODES
7" HORIZONTAL SHAPER
3½" VERTICAL SLOTTER

Convertible

TO A SHAPER
OR SLOTTER
IN 15 MINUTES

THE RHODES MANUFACTURING CO.
WALTHAM 54, MASS., U. S. A.

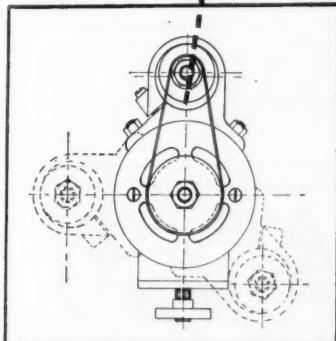
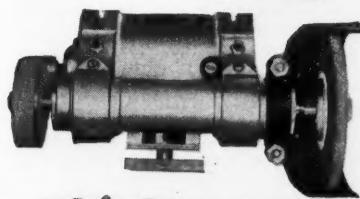
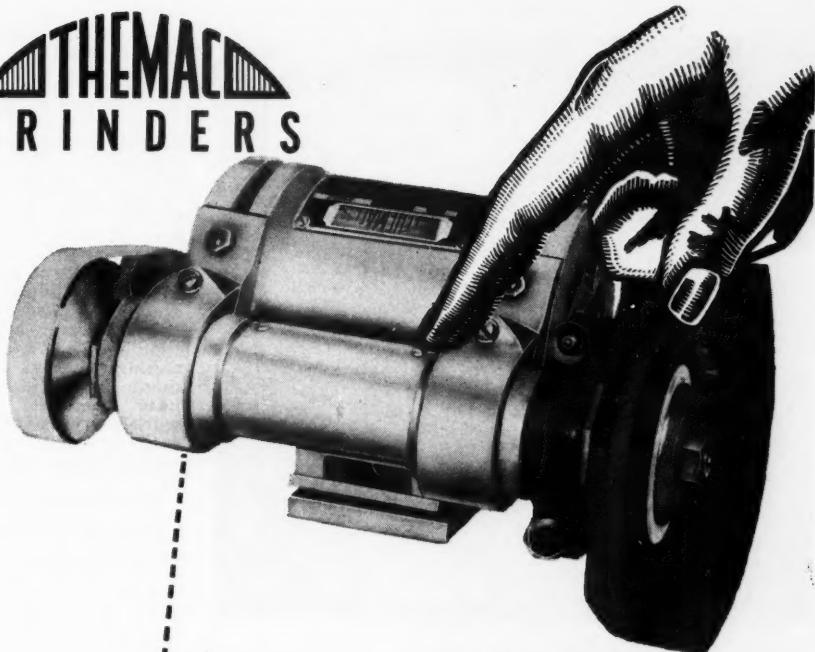
be used for the precision flat lapping of machine and tool parts, flat sliding surfaces, flat rotating surfaces, air-tight and liquid-tight seals, and flat surfaces on plastics molds, die-casting molds, and drawing dies. Extra standard or special lapping plates can be easily placed on and taken off the machine without tools of any kind since no bolts, screws, or fastenings are required to hold the plates on the machine.

All gears and bearings of the machine are factory sealed in lubricant for the life of the unit. The lapping plate revolves on a number of precision sealed and greased-for-life high quality ball bearings. The machine is compactly constructed and is said to require a minimum of attention or care.

Bullard Man-Au-Trol Spacer

Pin-point precision in the drilling of holes in metal parts without the use of jigs and at a saving in time of 20 per

THEMAC GRINDERS



The dotted line points to the manually operated eccentric tube. This exclusive THEMAC feature provides proper belt tension at all times.

The sketch to the left illustrates the circumferential adjustment of Spindle Assemblies, which is 270 degrees for type J-45.

You can do any type internal or external grinding, on any size lathe, with THEMAC grinder Type J-45. Its interchangeable spindle extensions make this a tool of many uses.

Holes $\frac{1}{4}$ " to $\frac{1}{2}$ " diameter can be ground to a depth of $\frac{3}{4}$ ".

Holes $\frac{5}{8}$ " to $2\frac{1}{2}$ " diameter can be ground to a depth of 2".

Special extensions up to 6" in length can be supplied as extra equipment.

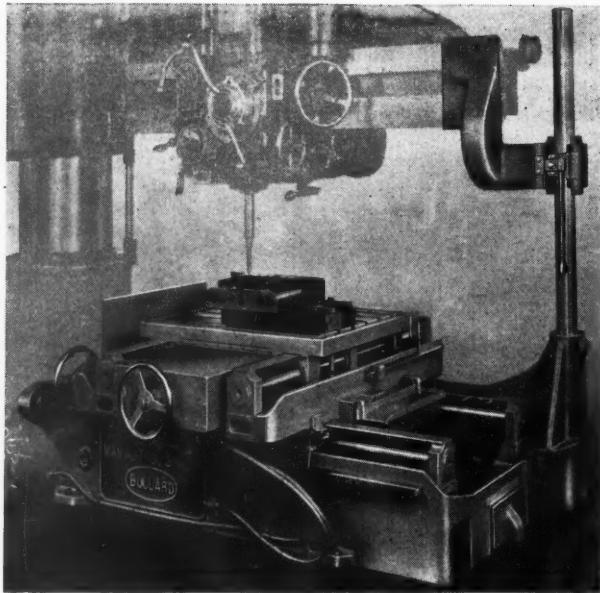
Write for catalog describing other features. Sold through your local mill supply distributor.

THE McGONEGAL MANUFACTURING CO.

135 MOZART STREET

EAST RUTHERFORD, N. J.

Bullard Man-Au-Trol
Spacer



cent or better are said to be possible through a device which has been brought out by The Bullard Co., Bridgeport 2, Conn. Known as the Man-Au-Trol Spacer, the unit consists of a heavy flat table which moves either laterally or longitudinally on its base under an accurate drill spindle fixed rigidly in one position. With the work clamped in place, the table is hydraulically traversed from one predetermined position to another by means of two selector controls; one for lateral positions, the other for locating longitudinal positions.

The setting of the selector dial by the operator determines which one of a num-

ber of cylinders is to receive the hydraulic pressure. A piston in the cylinder reacts to the thrust of the pressure thereby moving the table. Motion continues until the piston reaches a positive stop. The position of this stop may be varied and selected through screw adjustment. Once the stops have been set, the work-carrying table is said to return to them with extreme accuracy.

One hydraulic cylinder is provided for each longitudinal and transverse motion. Force from a balanced master cylinder, working in conjunction with the force of

any active cylinder, provides a rapid but smooth motion from one location to another and locks the table against its stop. Hydraulic power to operate the spacer is provided by a self-contained pump operated by a constant speed motor, which is the only electrical equipment required.

With the Man-Au-Trol Spacer, operator fatigue is said to be reduced to a minimum. Since the drilling head is in a fixed position on the rail and the table moves the work effortlessly past the operator while he stands in one position, hand cranking for positioning the tool is eliminated. Inspection likewise be-

New NESTING TYPE
TOTE PANS



20" Long x 12"
Wide x 6 $\frac{1}{4}$ " Deep
16 Ga., drag holes,
handles both ends.

J. L. LUCAS & SON, INC.
BRIDGEPORT 5, CONN.



DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.
WATTS BROS. TOOL WORKS
Wilmerding, Pa.



Gears requiring 40 minutes (floor to floor) for grinding are being shaved in just 5 minutes.

The shaved gears are just as accurate dimensionally as the ground gears; tooth surfaces are just as smooth and of equal if not greater importance, the shaved gear teeth are entirely free of those prevalent hairline grinding cracks which so often result in fatigue failures. Thus by shaving you get better gears faster and at less production cost.

Gears are shaved on Red Ring Rotary Shaving Machines which produce smooth tooth surfaces and correct errors of helical angle, profile and eccentricity. Gears from $3/16$ " to 220 " P. D. can be shaved. Those from $3/8$ " to 36 " P. D. can also be crowned to avoid the danger of failure due to "End Bearing."



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5600 ST. JEAN, DETROIT 13, MICH.

SPECIALISTS ON SPUR AND HELICAL
INVOLUTE GEAR PRACTICE

ORIGINATORS OF ROTARY SHAVING AND
ELLIPTOID TOOTH FORMS

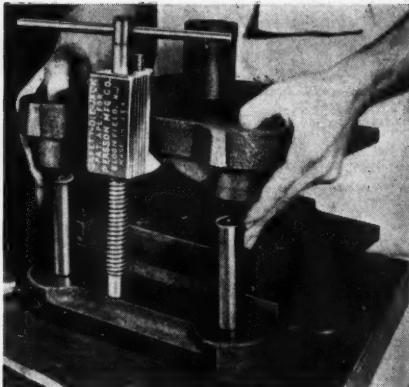
comes simplified. First-piece inspection is all that is claimed to be necessary. Once a piece has been spotted with the drill and the location of the holes checked by the inspector, the Man-Au-Trol Spacer is said to duplicate that pattern with unfailing accuracy, ensuring absolute interchangeability.

The Man-Au-Trol Spacer may be applied to various types of drilling machines. The device is made in a variety of sizes, from one with a work-carrying table measuring several inches square to others capable of handling massive work.

Persson Safety Die Jack

Product of the Persson Manufacturing Co., 2 Henry St., Bloomfield, N. J., the Persson Safety Die Jack shown in the accompanying illustration is designed to provide an easy, fast, and efficient method of separating die sets. The jack, which can be applied to the punch holder in a matter of seconds enables a single operator to elevate the punch holder accurately to any height required and to lower it in the same effortless manner.

The Persson Safety Die Jack is precision built throughout for easy screw



Persson Safety Die Jack in Use

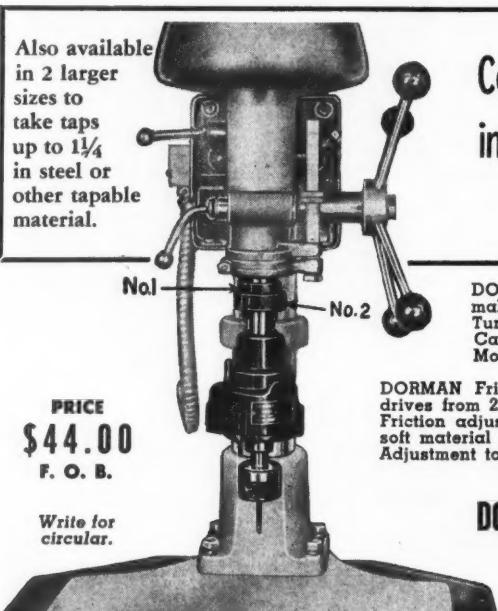
action. The clamp block is of one-piece heat-treated high-quality aluminum alloy which is said to be capable of withstanding tremendous loads. All other parts of the unit are accurately machined from fine steel. Compactly constructed, the jack can be easily fitted into a toolbox when not in use.

Also available
in 2 larger
sizes to
take taps
up to $1\frac{1}{4}$
in steel or
other tapable
material.

No. 1
No. 2

PRICE
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Convert your drill press
into a sensitive precision
tapping machine

DORMAN TAPPERS attach directly to all male spindle drills including Walker-Turner, Atlas, Buffalo Forge, Boice Crane, Cannedy-Otto, Etc. Also available with Morse Taper Shanks.

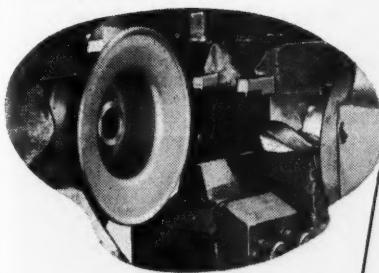
DORMAN Friction Drive Automatic Reverse Tapper drives from 2-56 tap to $\frac{3}{8}$ " in any tapable material. Friction adjustable from light drive for small tap in soft material to positive drive with $\frac{3}{8}$ " tap in steel. Adjustment takes less than one minute.

Manufactured by

DORMAN MACHINE TOOL WORKS

357 CANAL ST.

NEW YORK 13, N. Y.



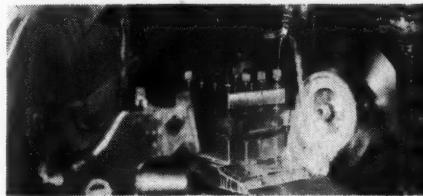
Machines Run 4 Times Longer Per-Tool-Grind! In job-lot machining of cast iron pulleys, "Standards"—adapted to 8 roughing and finishing operations—held down initial tool costs, stepped up production, kept machines running 4 times longer per tool grind.

JOB LOT WORK or MASS PRODUCTION

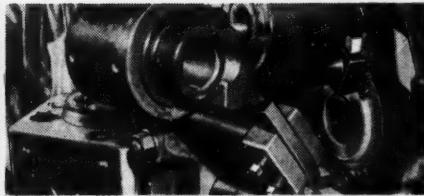
CARBOLOY CEMENTED CARBIDES

"Standards"

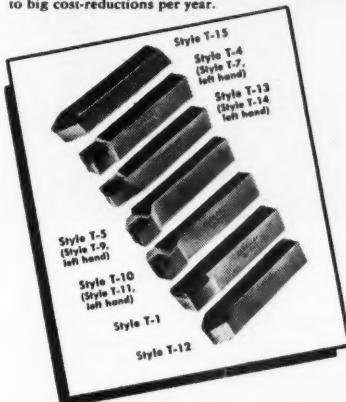
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4 Stations on Turret Eliminated—19 Tools Saved! By tooling up with Carboloy Cemented Carbide "Standards", 4 turret stations were eliminated, 19 tools saved. Savings like this, month after month, add up to big cost-reductions per year.



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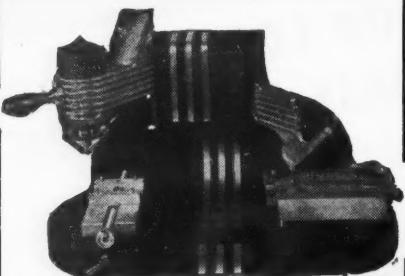
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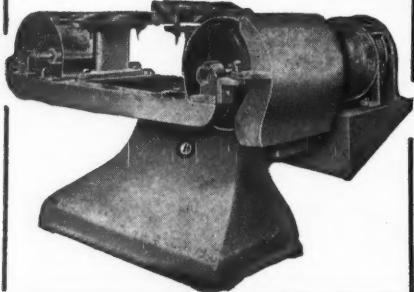
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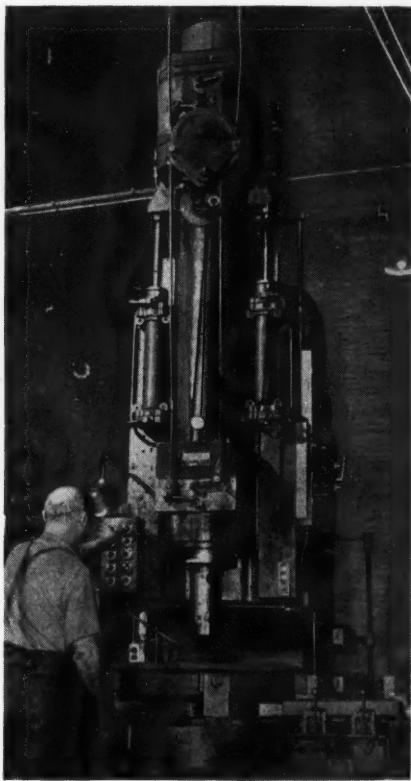
Send for illustrated pamphlet.

**PRODUCTION
MACHINE CO.**
Greenfield,
Mass.



Pullman-Standard Railway Car Wheel Boring Machine

A railway car wheel boring machine, revolutionary in operation, has been designed by the Pullman-Standard Car Manufacturing Co., Pullman Bldg., 79,



**Pullman-Standard Railway Car Wheel
Boring Machine**

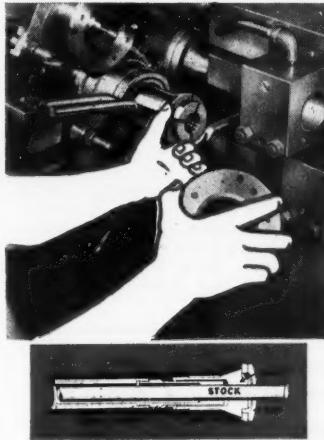
E. Adams, Chicago, Ill. Taking advantage of war developed techniques in the use of carbide-tipped tools, the machine feeds a rotating boring tool into the hub of a stationary car wheel. By roughing and finishing the wheel in one operation and the use of a shifting table which permits loading and unloading of wheels while another is being bored, production is speeded to the point where the machine is capable of boring 43 or more chilled tread wheels per hour and a sim-

"PRECISION and SKILL"

This is a 40-minute, 16mm. sound motion picture which is available to interested groups. It demonstrates important features and uses of the GREENLEE "6". Write for a date.



The pictures below illustrate (top) how easily the collet is withdrawn after the nose cap has been removed and (bottom) a schematic cross-section of the spindle showing the sliding sleeve which operates the collet.



CAREFULLY MADE SPINDLES FEATURE POSITIVE COLLET HOLDING, ACCURATE FEED

CONSTRUCTION REFINEMENTS: On the Greenlee "6" the spindle assemblies and the carrier in which they are mounted are made with exceptional care and precision to insure accurate work. The spindles are precisely spaced and run smoothly and accurately in double opposed tapered roller bearings. The carrier is a semi-steel casting, heat-treated and accurately ground, with hardened steel inserts for the positive locking block.

COLLET PRINCIPLE: A sliding sleeve acts over the taper of the collet, producing no endways movement of the collet and thus none is transmitted to the stock. Collets and nose caps are easily removed, and all six collets on the GREENLEE "6" can be changed very quickly. These distinctive features provide greater accuracy of work and greater speed and efficiency of change-over.

SEND FOR BOOKLET. Write today for a copy of our 20-page descriptive bulletin "Greenlee Automatic Screw Machine" and learn the many reasons why the GREENLEE "6" is often called "The Operator's Favorite".



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1890 MASON AVE., ROCKFORD, ILLINOIS
WRITE TODAY FOR MORE FACTS

MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

ilar number of steel wheels.

The machine is arranged with a revolving spindle which supports a boring bar that is equipped with tools to rough and finish cut the wheel bore and to cut a starting taper. The latter facilitates pressing the car wheel on the axle. The spindle is gear driven, with a selection of speeds available to allow for the boring of cast iron or steel wheels.

In use, the wheel is chucked on a table which automatically shuttles from the work position to a loading and unloading position at the right or left of the work position. The loading and unloading are



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**HEADBAND
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2 1/4 X

Use of both eyes reveals true depth of details. Magnification of $2\frac{1}{4}$ X. Free working distance.

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6 and 9 power



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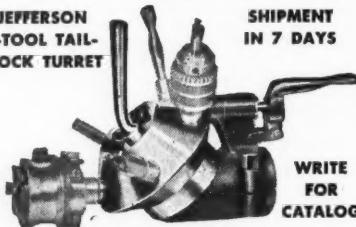
CARL ZEISS, INC.

Dept. H-51-10, 485 5th Ave., New York 17, N. Y.

Setting the cutting tool in the boring bar of the Pullman-Standard Railway Car Wheel Boring Machine. The push button panel under the lamp shade controls all phases of the machine's automatic cycle of work.

accomplished with a "Powell" loader, which is a mechanical device of Pullman-Standard invention. The table slides on a double set of hardened V-ways which retain it in the center position along the longitudinal center line as it wears from service. The wheel is carried into the work position supported on a five jaw chuck. Two of these chucks are provided, one supporting a wheel in the work position and the other being unloaded or loaded, as the case may be. When the table shifts, placing a wheel under the boring bar, the travel is cushioned to a stop when a lock pin is forced up into the table to secure it in the exact central position. This feature is interlocked with the bar feed control in a

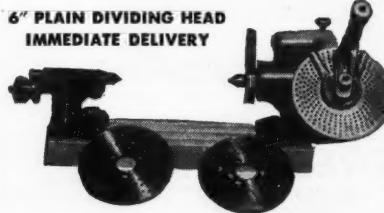
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STOCK TURRET



SHIPMENT
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We purchased them for our production. Now our Sentry High Speed Steel Hardening Furnaces are doing profitable outside work in addition - because they are doing such an outstanding job.

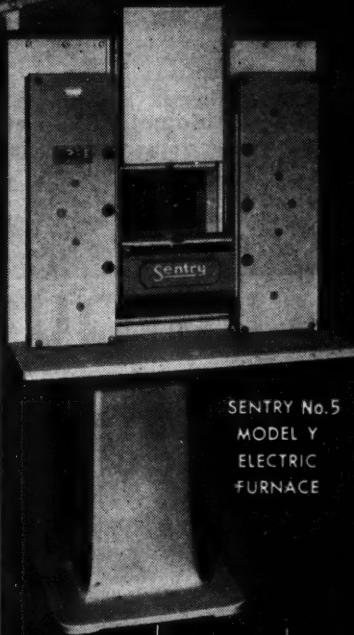
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Several owners of Sentry Model "Y" Furnaces have enthusiastically told us this story. Too, they praise Sentry Diamond Blocks for maintaining the correct atmosphere to produce clean, scale-free, true-to-size high speed steel hardening.

Sentry Furnaces waste no time in getting up to heat — waste no fuel — give off no fumes. Produce large quantities of uniformly heat treated work, quickly. Sentrys are especially adapted for all, molybdenum, tungsten, cobalt high speed, and high carbon high chrome steels.

Sizes and capacities to meet your requirements.

Send for bulletin 1005-TE9



SENTRY No. 5
MODEL Y
ELECTRIC
FURNACE

The Sentry Company
FOXBORO, MASS., U.S.A.



manner to prohibit the starting of the feed until the table is locked in place.

The closing of the chuck jaws is accomplished manually by moving a lever which actuates a hydraulic cylinder. A rack engages teeth in a ring which has cam shaped slots arranged to close and open the chuck jaws. Jaws are operated independently of all other functions of the machine, and the separate chucks are operated independently of each other as a safety measure.

The control of the boring bar and spindle is such that the bar is fed down to the wheel rapidly until it reaches the boring position, at which point the downward travel is slowed to the predetermined feed rate. After the boring tool completes its travel through the wheel, a chamfer tool engages the start of the bore and feeds down for approximately $\frac{1}{4}$ inch when there is a slight dwell. The motor circuit is then interrupted and the boring bar recedes rapidly through the bore, coming to rest in its upper position.

La Bahn Automatic Roll Feed

A roll feed for automatically feeding stock into punch presses is now being marketed under the name of La Bahn by

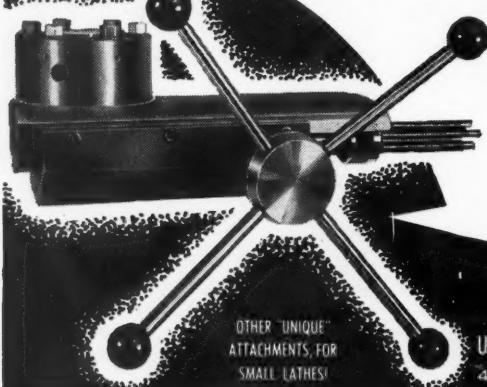
the Schultz & Anderson Co., 111 Edison Place, Newark 5, N. J. The roll feed is made in various types to meet practically every requirement of feeding stock from coils or strips and to fit all sizes and makes of presses.

According to the manufacturer, the outstanding feature of the La Bahn Automatic Roll Feed is its simplified method of operation which eliminates complicated parts and ensures rapid, smooth, accurate feeding under all conditions. The rolls in the feed are arranged to turn only when the stock is being fed into the press, and, at the end of the forward movement, the rolls are separated by a lifter which is actuated by the ram of the press to ensure that the proper amount of material is fed into the press.

Power for driving the feed is transmitted by a crank disc which is mounted on the crankshaft of the press and is adjustable to obtain the exact amount the stock is to be advanced. The lower feed roll is driven by a friction drive assembly which is mounted on the lower roll and in turn drives the upper roll by means of a pair of steel spur gears which are constantly in mesh. The upper roll is mounted in floating bearings which are guided by four steel posts. The upper roll is held in contact with the stock by

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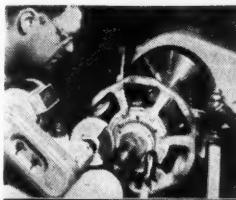


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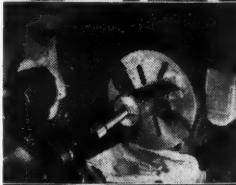
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1



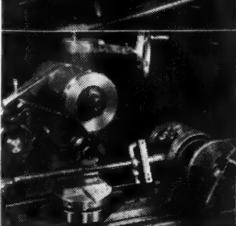
2



3



4



5

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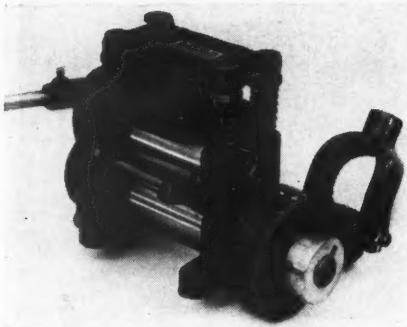
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DUMORE

PRECISION TOOLS

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in all principal cities



La Bahn Automatic Roll Feed

means of four adjustable compression springs, while feeding. To eliminate the possibility of too much stock being fed into the press during the stamping operation, the upper roll is raised by a lifter operated by a lever which comes in contact with the ram on the downstroke. Included in the feed is a brake which prevents excess turning of the rolls.

Since the feeding of the stock is accomplished by the frictional contact of

the rolls, the feeding stops the instant the ram reaches the bottom of the stroke, and the contact between the rolls and the stock is broken by the lifter mechanism. Where absolute accuracy is required, such as in progressive operation, a stop or pilot may be set in the die or incorporated in the die design.

The La Bahn Automatic Roll Feed is highly flexible in function and application and can be successfully applied to the feeding of coiled or strip steel, brass, copper, and aluminum, as well as paper, mica, rubber, leather, fiber, and so on. The unit is capable of handling various stock thicknesses and widths up to the width of the feed rolls, and is designed for mounting on the press in any position; that is, right, left, front, or rear. The direction of the feed can be easily changed by merely reversing the friction drive housing on the drive shaft. This makes possible and practical the mounting of several feeds in different positions on one press to feed different stocks simultaneously in correct lengths required.

Due to the rugged construction and smooth operation of the roll feed, it may be operated at high speeds without strain or undue wear and tear on any part, the manufacturer claims. In addition to standard models, the roll feed may also be obtained in special designs.

KNOBS • WHEELS • LEVERS *Ready for Immediate Delivery*



STANDARD CAST IRON HAND KNOBS



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STRAIGHT and OFFSET TYPE HAND WHEELS

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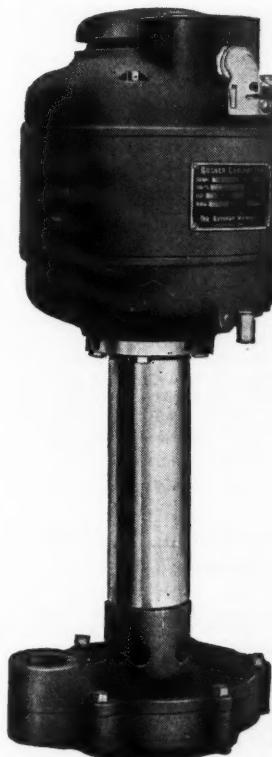
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MODEL TL7320

Yes, Ruthman Gusher Coolant Pumps are adaptable. Our line includes immersed types, tank units, pipe connected types, flange mounted and plain drive types, in capacities from 1/30 to 2 h.p.

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A MODERN PUMP FOR MODERN MACHINE TOOLS

SIMPLE — FAST — ACCURATE LOCATING



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FAST

200 - 1000 r.p.m. Bring thumb nail to bear against centering bead until it runs true. Stop machine and focus on work. Keep eye at least 4 inches from viewing aperture.

ACCURATE

Locate cross lines on work to match lines in viewing aperture.

Write for
catalogue No. 12

CENTER SCOPE PRODUCTS

3829 San Fernando Rd., Glendale 4, Calif.

Blu-Mol "Tensiometer"

Designed to set and maintain correct blade tension on power hack saws, the Blu-Mol "Tensiometer" illustrated here-with has been developed by the Millers Falls Co., Greenfield, Mass. The device comprises a small cylinder enclosing a strong, calibrated spiral spring. It can be easily attached to the blade holder of the machine and acts as a shock ab-



Blu-Mol "Tensiometer" in Use

sorber for the blade, automatically compensating for changes of feed pressure, thermal expansion and contraction, and unusual shocks such as caused by the blade striking a hard spot in the metal being cut.

By positively controlling any desired tension from 0 to 4,000 lb., the Tensiometer is claimed to (1) improve the accuracy of cuts, (2) maintain substantially constant tension regardless of lengthening of the blade due to heating and eye elongation (3) absorb shock and minimum blade breakage, and (4) greatly increase the cutting life of the blade and improve the complete cutting operation. The machine operator, by reading the calibrated indicator, can readily set the tension at the desired figure. The Tensiometer is easily set by hand to a tension of 3,000 lb. without using a wrench.

STANDARD



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TYPES

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SIZES



Two Spindle Head
Both Spindles
Adjustable

United States Drill Head Co.
Cincinnati 4, Ohio

Bellevue Continuous Salt Bath Furnace

A continuous salt bath furnace with automatic quenching mechanism designed for the purpose of cyanide hardening the ends of control levers has been completed by The Bellevue Industrial Furnace Co., 2971 Bellevue Ave., Detroit 7, Mich. With a few minor changes, the furnace can be used for hardening most any type of parts, including those contained in baskets.

The ferris-wheel type automatic loader, located at the charging end of the

Logan

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at these 39 points*
this Logan Lathe has
self-lubricating
bronze bearings

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|----------------------|--------------|
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| Reverse Gear Bracket | 2 |
| Gear Box | 10 |
| Headstock | 7 |
| Automatic Apron | 6 |
| Carriage Assembly | 4 |
| Turret Assembly | 2 |
| TOTAL | 39 |

*All models of Logan Lathes are similarly protected.

SELF-LUBRICATING BRONZE BEARINGS

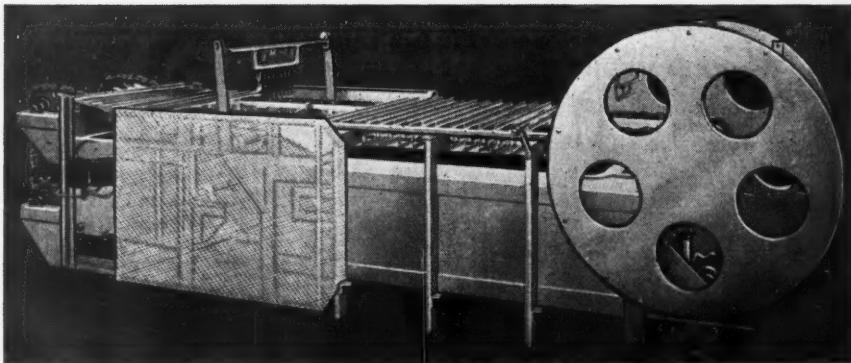
KEEP LOGAN LATHES READY TO RUN,
ADD TO SERVICE LIFE,
NEED FAR LESS OILING

The use of self-lubricating bronze bearings in place of plain bearings is typical of Logan Lathe design. The self-lubricating bearings are of a special bronze that is absorbent in texture and impregnated with lubricant. As a shaft revolves in one of these bearings, the lubricant is gradually released in a self-controlled flow which keeps an even film of oil over contacting surfaces. In this way, even though the lubricant is only infrequently renewed, the bearing surfaces are protected. In addition, the spindle on every Logan Lathe revolves on precision preloaded ball bearings that never need lubrication. This sustained lubrication is another factor in the sustained accuracy and long life of Logan Lathes. Get the full story of the advantages offered by the complete line of Logan Lathes from your Logan Lathe dealer, or write for a catalog.

SPECIFICATIONS COMMON TO ALL LOGAN LATHES . . . swing over bed, 10½" . . . bed length, 43½" . . . size of hole through spindle, 25/32" . . . spindle nose diameter and threads per inch, 1½"-8 . . . 12 spindle speeds, 30 to 1450 rpm . . . motor, ½ hp, 1750 rpm . . . ball bearing spindle mounting . . . drum type reversing motor switch and cord . . . precision-ground ways, 2 V-ways, 2 flat-ways.

J-2

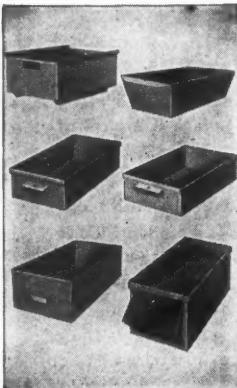
LOGAN ENGINEERING CO. CHICAGO 30, ILLINOIS



Bellevue Continuous Salt Bath Furnace

furnace, is provided with metal pockets for holding the specially designed fixtures supporting the workpieces. The loading pockets are spaced and synchronized so as to allow the fixtures holding the parts to be placed in the slots provided on the continuous chain, which travels the entire length of the machine, including the furnace and quench tank.

As the work-holding fixture is placed on the chain, the work is conveyed through the salt and the entire length of the furnace. When the fixture reaches the discharge end of the furnace, a rotary arm operating automatically and synchronized with the speed of the chain picks up the fixture containing the work and drops it into the quench tank. The



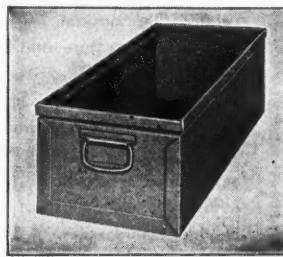
Top Rim STEEL STACKING BOXES

18" x 12" x 6". 16 Ga.
with Drop Handles—\$1.27 each

STANDARD SIZES

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- 16 x 10 x 6.....16 Ga.
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- 18 x 12 x 8.....16 Ga.

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WE MANUFACTURE ALL TYPES OF STEEL BOXES

We make a specialty of boxes made to fit your particular handling requirements. Special boxes designed so they can be run thru with standards enable us to quote prices comparable with that of a standard box.

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183 CHARLES ST.
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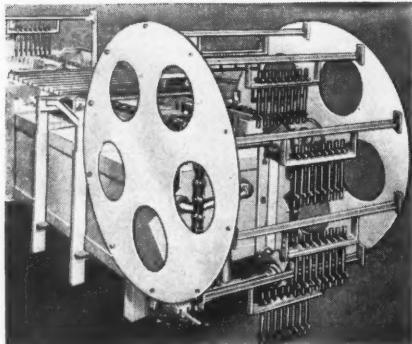
a ten-thousandth is routine . . . where **JO-BLOCKS** control by *millionths!*

It PAYS to control parts-dimensions to close limits. It pays in ease of assembly, in product performance and in the assured fit of replacement parts. In wartime, it paid richly in human lives saved. JO-BLOCKS, the pioneer precision controls, produced in America by Ford Motor Company only, for all industry, are warranted accurate to .000002", .000004" or .000008"±, and are available in sets at \$23 and upward, or in individual blocks, with various accessories. With properly selected genuine Jo-Block equipment, accuracy control can be maintained to the highest practical degree over any mechanical dimensional inspection.

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Profusely illustrated, with full details, covering selection, application and care of Jo-Blocks. Write Ford Motor Co., Johansson Division, Dept. 109, Dearborn, Michigan.

Ford
Johansson
GAGE BLOCKS



Close-up view showing ferris-wheel type loading mechanism

quenching operation is completed in four seconds, the speed may be changed to meet metallurgical requirements.

The Bellevue Continuous Salt Bath Furnace can be provided with oil, water, or hot salt quench tanks, and an unloading mechanism synchronized with the chain and arranged to discharge the

workholding fixtures on a conveyor can be provided. A variable control drive is supplied to permit the changing of the time cycle for parts passing through the furnace.

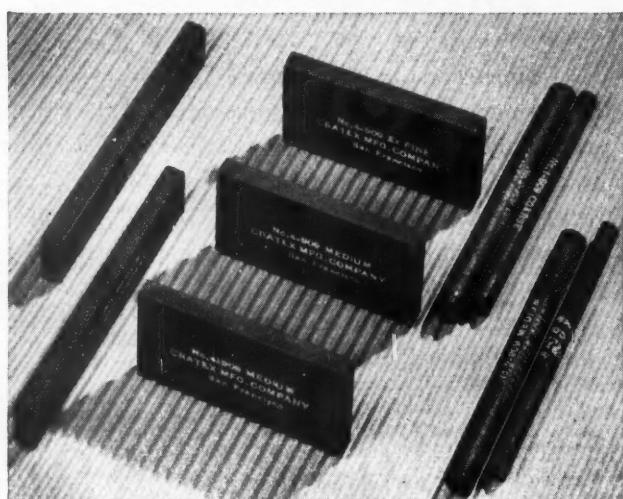
"Ther-Monic" Model 1400 High-Frequency Induction Heater

The Induction Heating Corp., 389 Lafayette St., New York 3, N. Y., announces the addition of a high-frequency induction heater for electronic heating to its line of "Ther-Monic" induction heating generators. Designated as the Model 1400, the unit features a filament voltage stabilizer, variable output control, circuit-braker overload protection, water-pressure gage, time-delay water system, and supervisory pilot-light control.

When fully loaded, the unit is said to be capable of delivering an output of 1,400 B. T. U. per minute or approximately 25 kw. at a nominal frequency of 375 kilocycles into a piece of work. It has a full-load input of 50 kva at 90 per cent power factor and is designed for operation on a 205-245 volt, 60-cycle, three-phase power supply. Since line

CRATEX RUBBERIZED ABRASIVES BLOCKS STICKS

Do Better Work



Superior quality Blocks and Sticks for removing rust, slight blemishes, heat marks, tarnish and stain; also clean and polish molds; removes burrs from light castings.

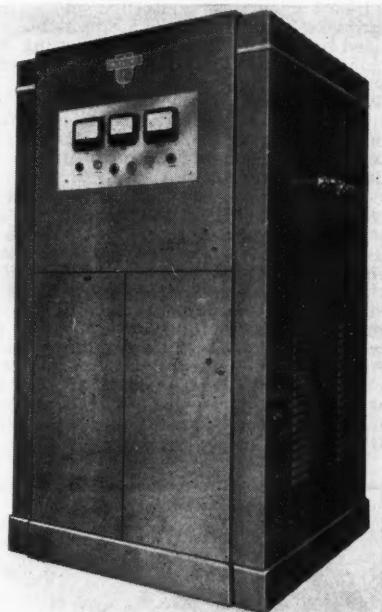
At Tool and Supply Dealers

ASK FOR CATALOG.

CRATEX MANUFACTURING CO., 97 Natoma St., San Francisco, Calif.

voltages of 550 or 440 volts are common in some plants, provision is made for reducing these voltages to 220 volts through the installation of a transformer between the line and the generator.

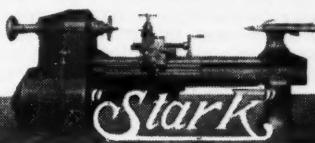
The tube complement of the generator consists of two water-cooled oscillators



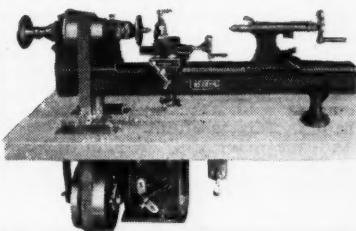
"Ther-Monic" Model 1400 High-Frequency Induction Heater

and six rectifiers. These tubes are protected against damage by a time-delay water system which automatically keeps water flowing through the water jackets of the tubes after the generator is turned off.

To protect both operating personnel and equipment, the Ther-Monic Model 1400 Induction Heater is provided with a number of additional safety features. An automatic filament voltage stabilizer controls all filament voltages on the tubes to a predetermined value independent of line voltage variations. To protect the equipment against overload, an instantaneous circuit breaker is employed. For convenience, a pressure gage is supplied on the generator to indicate the actual water pressure applied to the generator. A variable output con-



Integral Drive Precision Bench Lathes. Double-taper headstock bearings of highest accuracy, or best precision pre-loaded ball bearings. Two good sizes $\frac{3}{4}$ " and 1". 30 Precision attachments available.



Open Cone Lathes world-known. Four sizes, with compact under-bench Motor Drive Unit.

Stark Precision Bench Milling Machine.

Plain and Spiral Models



"ELECTROBLAST" High Speed Muffle Furnace. Two excellent small sizes.

Stark Tool Company

WALTHAM, MASSACHUSETTS

ESTABLISHED 1862

Originators of the American Bench Lathe

trol permits the power output of the generator to be adjusted from approximately 10 per cent to full load by means of a single valve. The instrument panel includes pilot lights which provide supervisory control on the overload relay and water system.

The Ther-Monic Model 1400 Induction Heater can be used as a source of energy for brazing, soft soldering, and fusing, as well as for hardening, annealing, tempering, stress relieving, forging, melting, shrink fitting, debonding, and expanding. The steel cabinet of the generator is 42 $\frac{3}{4}$ inches wide x 39 $\frac{1}{4}$ inches deep x 73 $\frac{3}{4}$ inches high. The unit weighs approximately 3,700 pounds.

G & H Collet Indexing Fixture

Constructed to hold work for milling, grinding, drilling, and shaper operations, a collet indexing fixture which is claimed to be of special advantage where accuracy of work location and convenience of loading and unloading work are important factors is announced by the G & H Manufacturing Co., 327 Elm St., Fitchburg, Mass. The fixture can be positioned either horizontally or vertically on

the machine work table with equal facility and efficiency.

According to the manufacturer, the design of the fixture prevents movement of the work once it is gripped in the collet, and the stock does not change position during the collet closing action—a feature which is especially important when length tolerances are close. Removable screw-inserting stop buttons are used to block out unwanted indexing stations in a particular setup. The index plates are likewise removable. A selected position is quickly and easily introduced, or an undesired station blocked out of indexing sequence by merely removing or inserting a screw in the indexing plate slot.

A chip clearance hole extends through the entire depth of the fixture for the purpose of offering a ready exit for chips and to prevent them from clogging working parts in the fixture. The bottom section of the fixture is of open construction so as to allow chips to be quickly removed as they fall through onto the work table. Chips likewise are said to roll off of the fixture without interference due to the design of the fixture which includes no projections or ledges that can form traps for chip accumulation.

High Speed
COUNTERBORES
BACK SPOT FACERS
Interchangeable
Catalog
on
Request

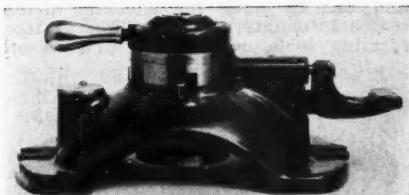


BICKNELL-THOMAS COMPANY
Greenfield . Massachusetts



TYPE HOLDERS AND TYPE ROLL MARKERS
HAND STAMPS LOGOTYPES DIES STANDARD
AND SPECIAL STAMPS INSPECTORS' STAMPS
MACHINE ENGRAVING PRECISION DUPLICATING

NEW METHOD STEEL STAMPS, Inc.
149 Joseph Campau, Detroit 7, U.S.A.



Side view of G & H Collet Indexing Fixture showing open bottom section for easy chip removal

The G & H Collet Indexing Fixture is recommended for use with collets commonly used in Brown & Sharpe automatics and wire feed screw machines. However, other types of draw-in and push-out collets can be used when desired, providing the fixture is equipped with the correct closing piece.

Benton Opti-Check

The Opti-Check, a simplified optical tool designed by The Benton Co., 351 S. La Brea Ave., Los Angeles 36, Calif., is

constructed to quickly and accurately measure rake and clearance angles on all types of cutting tools and is said to be useful for many precision measuring applications.

Angular measurements on cutting tools are taken by holding the tool in contact with a straightedge mounted on the Opti-Check base and aligning precision guide lines in an optical viewer with the cutting edge. Readings are then taken directly from a protractor scale. Both the image of the tool and the protractor are viewed through magnifying lenses for maximum accuracy and ease of reading. When measuring difficult angles on large workpieces, the Opti-Check can be used in conjunction with a surface plate.

The optical unit consists of a reticle mounted in a short aluminum barrel and upon which crosslines are scribed. The reticle and tool under inspection are viewed through a magnifying lens from a normal reading distance.

The base is made in two parts, the lower portion being equipped with a straightedge against which the tool is held. A dovetailed slide in the upper portion permits lateral adjustment of the optical unit and contains a bushing in which the optical assembly is snugly

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FEED BULLET CORES,
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inserted. The optical unit may be rotated in the bushing independently from the pointer, thus providing a zero adjustment of the crosslines. To obtain a reading, the bushing and optical viewer are simultaneously rotated by the pointer until a crossline parallels the cutter angle. Magnified angular readings are then taken directly from the protractor scale through a second lens permanently mounted in the pointer.

The Opti-Check is designed to verify correct cutting angles, exact clearance angles, and uniform length of cutting lips on all tools up to 1 inch in diameter,

and can be used for checking drills, reamers, counterbores, milling cutters, forming tools, lathe tools, and so on.

A MARK IS ONLY AS GOOD AS THE DIE THAT MADE IT

Noblewest makes marking dies to one standard of quality only — the finest. Nothing less will do for precision marking and that means the finest grades of steel plus the skill of master craftsmen with over 40 years know-how. Specify Noblewest marking dies for unexcelled quality.

MARK IT BEST WITH
NOBLEWEST

The Noble & Westbrook Manufacturing Company
East Hartford 8, Conn.

NOBLEWEST IMPROVED MARKING DEVICES



Benton Opti-Check

The instrument is said to readily adapt itself to many other inspection and measuring problems. Duplication of the most efficient cutting and clearance angles for a particular job is claimed to be easily accomplished, and tools may be inspected on the grinder for accuracy or on the machine for production wear without removal from the machine.

All optical elements of the instrument are precision ground and, to reduce weight, metal parts are made of aluminum alloys, finished in satin luster. The Opti-Check is supplied packed in a wooden box.

**TO RAISE PRODUCTION — CUT COSTS
THE READING BROACH KEYSEATER**

The Reading Bench Machine does not require bushings or guides. No other machine like it Very fast—capacity from $\frac{1}{8}$ to $\frac{3}{8}$ cutter.

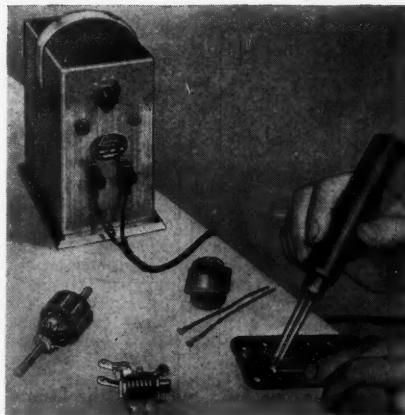
Low first cost—prompt delivery.

READING MACHINE COMPANY • Reading (Cincinnati), Ohio

Luma Resistance Type Soldering Tool

With two power unit models and a choice of eight basic single or double carbon electrodes, the Luma Resistance Type Soldering Tool shown herewith, product of the Luma Electric Co., Toledo 1, Ohio, can be used for fine precision or heavy industrial operations. Four ranges of power units are offered—two single and two multi-stage. The two single-stage tools each have a range of from 1,050 to 1,225 watts. The two multi-stage tools each have a range of from 1,575 to 2,500 watts. The multi-stage tool illustrated herewith is equipped with a selector switch that provides instant temperature control at six different settings to suit the soldering job at hand.

Electrodes used are equipped with 5-foot extra flexible cables and are available in sizes ranging from $\frac{1}{8}$ to $\frac{1}{2}$ -inch diameter. The $\frac{1}{8}$ -inch electrodes in both single and double types are specially adapted to light terminal work, manufacturing of jewelry, motor armatures, fuses, radios, microphones, harnessed assemblies, and so on. The weight, including cable, is 6 oz. Fiber glass installation separates the tubes holding the car-

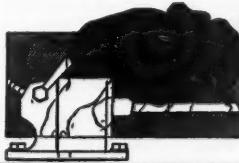


Luma Resistance Type Soldering Tool

bons. For heavier operations, the $\frac{1}{4}$ -inch single and double carbon electrodes are said to be best suited. For spot soldering and work involving seams and large terminals, the $\frac{3}{8}$ and $\frac{1}{2}$ -inch single carbon or roller type is recommended.

Cut Costs With MEAD MIDGET AIR CLAMPS

Horizontal and
Vertical



Both models deliver 80 lbs. pressure on a line pressure of 100 lbs. They'll save countless man-hours in assembly operations involving welding, riveting, bolting, etc. Advantages over mechanical clamps: 1. Any number can be operated by single master valve. 2. Easily installed in cramped corners. 3. Equal ram pressure at any stroke point. Send for new Mead AIR POWER Catalog, describing our line of Air Clamps, Air Vises, Air Presses, Work Feeders, Valves, Controls, etc.

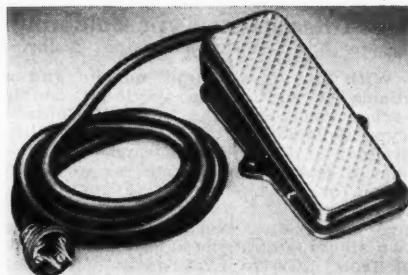
MEAD SPECIALTIES COMPANY
4114 N. KNOX AVE. Dept. AA-106 CHICAGO 41, ILL.

All power units are fiber-glass insulated throughout and may be used continuously. The aluminum encased power unit, complete with cables and electrodes, has a shipping weight of 40 pounds.

Electronic Controls Foot Pedal Switch

A foot-operated switch for series circuits only and suitable for use with the Electronic Controls Model 1029 timer or other equipment requiring accurate control of power with complete freedom of the operator's hands is now being marketed by Electronic Controls, Inc., 44 Summer Ave., Newark, N. J. The switch is ruggedly constructed of cast aluminum and is provided with screw holes which allow for fastening of the unit to the floor or machine. The treadle is a non-slip type diamond plate.

Said to have a power handling capacity of 1,000 watts at voltage up to 220 volts, a.c. or 32 volts, d.c., non-inductive loads, the Electronic Controls Foot Pedal Switch is furnished with a heavy approved rubber cord terminated in a non-shattering male plug. The switch mech-



Electronic Controls Foot Pedal Switch

anism is a high quality snap action type and can be supplied SPST either normally open or normally closed as long as treadle is held depressed. Easily replaceable, the switch mechanism is also available SPDT and is designed for operation with very light pressure.

**M-B MODEL HD-CR
40,000 RPM**

"**HEAVY DUTY**" Pneumatic
GRINDER

A powerful, versatile tool — can be fitted with three different spindle noses to handle mounted wheels with $\frac{1}{4}$ " diameter shanks, also unmounted wheels with $\frac{1}{4}$ " diameter and $\frac{3}{8}$ " diameter holes. Made with compound rotors, an abundance of power. Fitted with steel body, a real safety feature. Special grease-sealed bearings, no lubrication required. Prompt Deliveries.

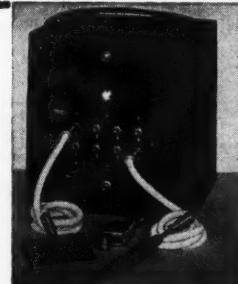
Representatives in Principal Cities.

M-B PRODUCTS
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DETROIT 26, MICHIGAN

Bullard Hydraulic Cut-Off Machine

Featuring safety, speed, and squareness of material cut, from the hardest

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IRON,
STEEL
and
CARBIDES**



**THE
Etchograph
WAY**

Original Electric Etcher

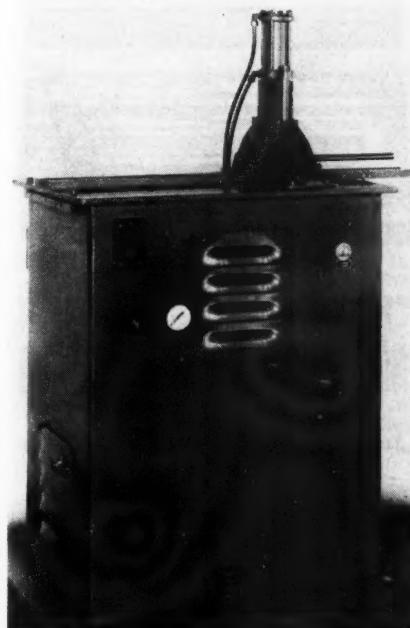
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

- Write for circulars and prices.

BREWSTER-SQUIRES CO.

Hudson Terminal Bldg. New York 7, N. Y.

of steel to the softest of non-ferrous metal, the Bullard Hydraulic Cut-Off Machine illustrated herewith has been brought out by Geo. H. Bullard Co., Westboro, Mass. The abrasive wheel is fully enclosed and is not exposed at any time.



Bullard Hydraulic Cut-Off Machine

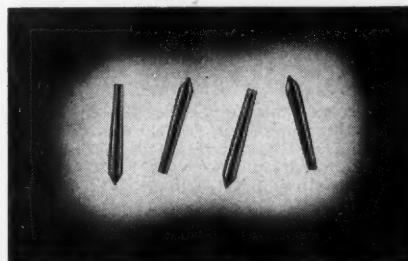
The spindle operates at 3,500 r.p.m., giving the wheel a 13,500 s.f.p.m. speed. The wheel is forced into the material to be cut by a hydraulic cylinder which can be adjusted to provide the proper amount of pressure without burning of the work. When the pressure is set, it remains constant, and the rate of work travel is the variable.

The Bullard Hydraulic Cut-Off Machine is designed to hold material on both sides with equal pressure so that the stock is finished to within 0.003 inch of square. V-ways controlling the motion of the wheel through the work are within 2 inches of wheel center so as to eliminate motion causing wheel "walk."

In use, a single starting button is employed to operate both the $\frac{1}{2}$ and 5 h.p. motor of the machine. The material is inserted in a V-trough to the desired

PRECISION PARTS

PRECISION CENTER



Precision-formed parts require precision-made centers, custom-built to fit special machinery. Those shown here are typical of the fine precision work Ace delivers on small parts and assemblies. Here you will find the complete modern facilities and the managerial know-how to turn out such parts quickly, accurately. Send sample, blueprint or sketch for prices.

RELY ON ACE FOR PRECISION GRINDING Centerless, Internal Cylindrical, External Cylindrical, Blanchard Surface, Plain Surface, and Thread Grinding.

PRODUCTION MACHINING Turning, milling, drilling, cutting, tapping, and threading of small machine parts that require precision grinding—on a mass-production basis.

METAL STAMPING Blanking, forming, and extruding of small metal parts on presses up to 75-ton capacity. Spot welding, sub-assemblies and assembly of intricate radio and machine parts.

HEAT TREATING Electric and gas furnaces, individually pyrometer controlled, for high-heat, quenching, and carburizing of parts up to approximately 10" x 10" x 15".

TOOL AND DIE WORK All operations for the production of Punches and Dies for small stampings, for Jigs, Fixtures, Gages, Moulds, Form Blocks, Tool Bits and Circular Form Cutters.



ACE MANUFACTURING CORPORATION

for Precision Parts

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length to be cut, after which a foot control is pressed, forcing the hydraulic work clamps down. The work-holding pressure can be varied from 157 to 282 lb. by means of a hand valve. After the work has been properly clamped, the wheel automatically starts upward. When the cut is completed, the foot control is released and the wheel drops down into the case before the clamps on the stock are loosened. The operator's hands are free at all times to guide the stock into position and to set the stop to the desired length.

To provide for long life, the arbor of the machine operates on two double rows of sealed ball bearings. The machine is recommended for use with 14 x $\frac{1}{2}$ x 1-inch resinoid bonded wheels.

Daniels Precision Reamers

The N. J. Daniels Tool Co., Inc., Haverhill, Mass., announces a complete line of hand and chucking reamers, both straight and spiral fluted in carbon and high speed steel. Said to be accurate to within 0.0002 inch the reamers are available in sets of various sizes ranging from $\frac{1}{4}$ to $\frac{1}{2}$ inch by 16ths to $\frac{1}{4}$ to 2 inches



Daniels Precision Reamers

by 16ths. Sturdy hardwood cases with individual compartments for each tool provide convenient and useful sets of reamers for toolmakers and machinists as well as for toolroom use.

Individual reamers are furnished in transparent plastic tubes which provide

Motors, A.C. & D.C.

Good delivery on $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{2}$ h.p.
direct current motors.



Direct Current Motor

We are also manufacturers of A.C. generators, 500 watts to 125 K.W., rotary converters, motor generators, high frequency generators, special A.C. motors, etc.

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DRILL GUIDE

PREVENTS BROKEN SCREWS
AND DRILLS



Insert drill through tool and fasten collet in drill chuck. Beveled plunger automatically centers in countersunk hole, retracting as pressure is applied.

This tool will accurately center and guide drills to proper depths.

Especially suitable for ski, cabinet, boat, and aircraft industries.



Standard sizes for $\frac{1}{16}$, $\frac{3}{32}$, $\frac{1}{8}$, and $\frac{3}{16}$ in. drills.

Ask your dealer or write us for details and prices.

KARTARIK, INC.

950 ARCADE ST.

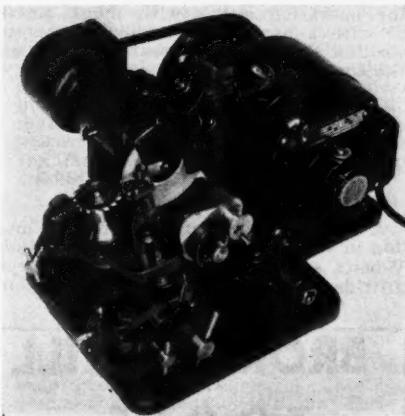
ST. PAUL 6, MINN.

complete protection for the cutting edges and permit selection of the proper type and size without unwrapping or handling the reamer.

Angle-Dressing Attachment for Waltham Cutter Sharpener

An angle-dressing attachment for use on its Waltham Cutter Sharpener is now being manufactured by the Edward Blake Co., 634 Commonwealth Ave., Newton Center, Mass. The face of the dish wheel used on this machine is dressed by means of the standard-equipment diamond. The attachment provides a second diamond for dressing the back and periphery of the wheel to any desired combination of angles. With the wheel formed to exactly the desired shape, deepening of the gash and sharpening of the face are accomplished in the same operation—an advantage of particular importance when sharpening cutters having a large number of teeth.

According to the manufacturer, the angle-dressing attachment greatly increases the scope of the Waltham Cutter Sharpener, which can be used to sharpen gear and thread milling cutters, circular



Waltham Cutter Sharpener Equipped with Angle-Dressing Attachment

form tools, and multiple cutters from the smallest sizes up to $3\frac{1}{2}$ inches in diameter. It can be employed for either radial or rake grinding and is adaptable

MILLING - DRILLING - BORING ATTACHMENT for Heavy Duty Operations

Photo shows a special operation not suited to standard straddle mill set up but easily handled by means of a RUSNOK Milling attachment used horizontally on a standard milling machine, saving one machining operation and accomplishing greater accuracy in finished piece parts. Uses many types of cutters on a wide range of work. Easily mounted—tilts to any angle. Large size spindle (No. 9 B & S taper). Takes $1/16$ " to $\frac{3}{4}$ " end mills. Large quill with 4" travel, counter balanced, hardened and ground. Six speeds 250 to 3000 RPM. Lever and worm feeds. $1\frac{1}{2}$ h.p. motor. Specially engineered by RUSNOK to meet modern demands for high speed, high precision, heavy duty and mill operations. Prompt delivery.

Write for illustrated circular and prices.



RUSNOK TOOL WORKS
4840 WEST NORTH AVE. CHICAGO 39, ILL.

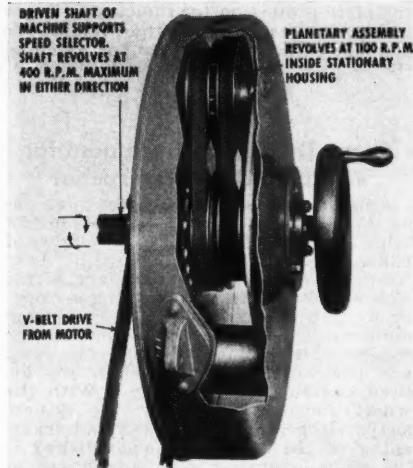
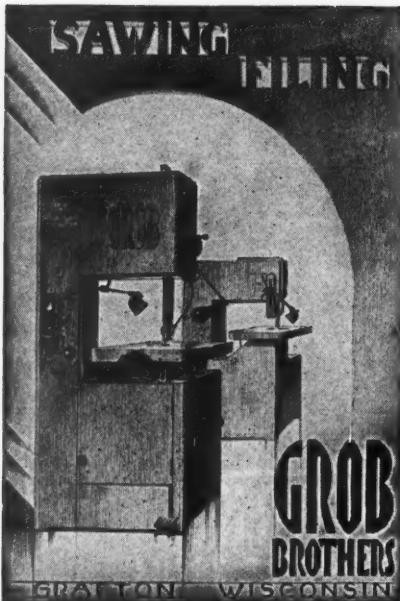
for operation either with index plates or with a pawl device which serves to position the cutter by locating either on the top or back of the tooth form.

Variable-V-Planetary Speed Selector

A new development of planetary motion in which two standard cross-section V-belts and four variable pitch pulleys provide infinite ratio, stepless speed from

**BROKEN DRILL
• TOOLS •
FOR AIRCRAFT PRODUCTION**

**TOPFLIGHT TOOL CO.
YORK - PENNSYLVANIA**



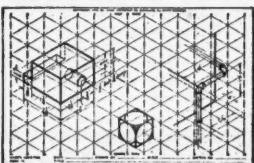
Variable-V-Planetary Speed Selector

full down through zero and into full reverse at constant torque of two-horsepower capacity is announced by The B. F. Goodrich Company, Akron, Ohio. A slight change in the variable pitch pulleys of the Variable-V-Planetary Speed Selector, as the development is known, effects a considerable change in output speed through the multiplying action of the planetary mounted on the motor or driven shaft of the machine on which it is used, thus eliminating the need for special mounting brackets or extra guards.

In operation, the Variable-V-Planetary Speed Selector system compares the ratios of two V-belt drives and applies the difference in speed to output shafts. With the ratios equal, the difference in speed and output shaft speed is zero. If the ratio of one drive is greater than the

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EASY TO MAKE
AND READ!



Makes clear blueprints. Saves time daily in hundreds of plants. Write for Circular.

Wade Instrument Co. 1422 E. 109th St., Dept. H, Clevel'd, O.

other, the output shaft rotates forward at a speed proportionate to the difference in ratios. If the ratio is less, the output shaft operates in reverse in the same proportionate ratios. Speeds from 400 r.p.m. to zero, forward and reverse, can be obtained.

All changes are made by a hand control wheel, which alters the pitch diameter of the center pulleys so that as one is increased the other is decreased and the change imparted to the outer pulleys by the wedging action of the V-belts. The wheel is mounted on the input shaft of the driven machine by a tapered collet and thus controls the diameter of all four pulleys without the use of springs or complex linkages.

The frame construction of the Variable-V-Planetary is of lightweight aluminum with cast iron sheaves for long wear. Prelubricated, plastic seal, ball type bearings are said to eliminate dirt and lubrication problems. Shafts and other wearing parts are hardened and ground to ensure precision fits and long life. Natural ventilation is created by the revolving assembly inside the aluminum housing. The complete speed range is covered by four and one half turns of the control wheel, with remote controls available.

Suggested machine applications for the

Variable-V-Planetary Speed Selector include agitators, bottling machines, brew kettles, calendars, card machines, conveyors, cookers, drill presses, dyeing machines, folding machines, grinders, hoists, lathes, meat grinders, milling machines, mixers, printing presses, process machinery, pumps, scale hoppers, shapers, slicers, stitchers, textile machinery, and wash tubs.

"Shearcutter" Boring, Turning and Facing Tool with Precision Toolholder

The Fearless Tool Co., 1234 S. Gramercy Place, Los Angeles 6, Calif., announces the addition to its line of "Shearcutter" micro-precision tools of a boring, turning and facing tool with precision toolholder for use on lathes, screw machines, drill presses, and boring machines. The outstanding feature of the tool is a circular cutter bit which is firmly fastened to the end of a specially designed holder. The penetration angle is such that a shearing action is attained and, as a result of this knife-like action, mirror-like finishes are said

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ROCKFORD
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MULTIPLE-DISC
CLUTCHES

Send for This Handy Bulletin

It shows typical installations of **ROCKFORD CLUTCHES** and **POWER TAKE-OFFS**. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications. Every production engineer will find help in this handy bulletin



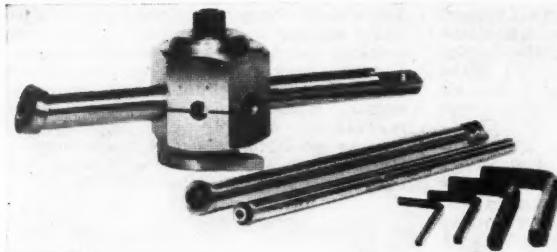
* Heat-treated alloy steel provides wear-resisting bearing surfaces that are machined to close tolerances. The shifter spool has a deep slot, hardened and ground, which prolongs clutch life and reduces shifter

Fork wear. Discs have flat, true surfaces, free from high or low spots. Thus operating conditions remain uniform, even after long service.

ROCKFORD CLUTCH DIVISION

300 Catherine Street, Rockford, Illinois, U. S. A.

BORG-
WARNER



"Shearcutter" Boring, Turning and Facing Tool with Precision Toolholder

to be produced with a minimum of friction heat.

A unique advantage of the cutter bit is the fact that 20 to 50 new sharp cutting edges may be presented to the work by simply rotating the bit, thus eliminating the necessity of stopping production at frequent intervals to resharpen the cutting tool. When resharpening becomes necessary, the cutter bit can be readily removed and resharpened in one minute, the manufacturer claims. Scientifically preformed for optimum cutting, the tool is said to retain its keen cutting edge over an unusually long period of time as a result of the shearing action and the manner in which the chip re-

moved in cutting slides back over the cutting edge, thus tending to keep it sharp.

The Shearcutter Boring, Turning and Facing Tool is supplied complete with three bit holders, six bits, and a toolmaker's precision boring tool holder made of high grade material and having bored and reamed holes for the bars.

Marton 8-Way Hand-Operated Air Valve

An 8-way hand operated air valve for the control of three double-acting air cylinders in succession but one at a time has been placed on the market by Marton Equipment, Inc., 145 Cabot St., Beverly, Mass. The detention mechanism in the

**CUT ANY SHAPE, CLEVERLY
with a
BEVERLY Throatless SHEAR**

Cuts straight and irregular shapes faster—better! Order No. 1 for 14 ga. (with High Carbon, High Chrome Blades for 18 ga.); No. 2 for 10 ga. (with H.C.H.C. blades for 14 ga.); and No. 3 for $\frac{7}{16}$ " mild steel or 10 ga. stainless. Write for catalog!

THE BEVERLY SHEAR MFG. CO.
3004 W. 111th St., Dept. 3, Chicago 43, Ill.

WALTHAM

Pinion and Gear Cutting Machines

with revolving cutter will make 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to $1\frac{1}{2}$ " dia. Revolving cutter makes successive cuts on blanks held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut. Write for Bulletin No. 112.

WALTHAM MACHINE WORKS
WALTHAM MASS.



Marton 8-Way Hand-Operated Air Valve

control lever permits the return of the third and second cylinders without changing the position of the first cylinder.

An addition to the patented Marton air control unit which combines pressure regulator, gage, filter, lubricator, and control valve, the 8-way hand-operated

air valve is supplied in $\frac{1}{4}$, $\frac{3}{8}$, and $\frac{1}{2}$ -inch pipe sizes. The body of the valve is of Meehanite and the valve disc is of hard bronze. It is self-sealing.

Watson-Stillman 500-Ton Die Press

A fully hydraulic 500-ton die press for use in hobbing and diesinking operations is announced by the Watson-Stillman Co., Roselle, N. J. Construction features of the press include a platen consisting of an openhearth steel casting with surface machined to smooth finish and accurately bored for the column. As a result of its unusual ruggedness, the platen is said to accommodate full-capacity loads on a small area.

The cylinder of the press is also constructed of open-hearth steel, with the column being a steel forging and the ram a close-grained iron casting. Both the column and ram are ground and polished. Adjustable babbitt guides serve as bearing surfaces for the moving platen of the unit.

The press can be supplied with a hand or motor-driven pump, the latter available in Vertical Triplex, horizontal, or Stedi-flow type. Inserts and guards are available as optional equipment.

The Hartford

The HARTFORD "Super - Spacer" has proved its wide possibilities to many users.

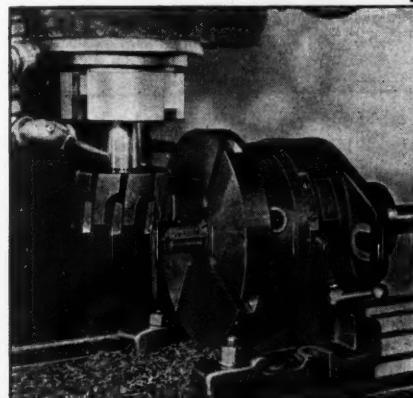
Assures accurate machining operations and rigid control on your milling, drilling, grinding, slotting and jig boring. It is simple, compact and rugged in design, operates at speeds and feeds limited only by the capacity of the machine.

Write for Complete Data

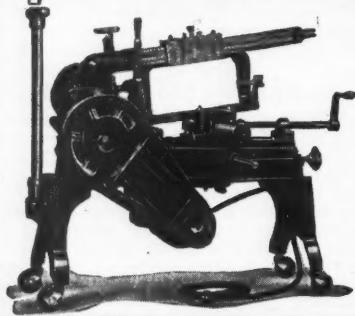
**THE HARTFORD
SPECIAL MACHINERY CO.
HARTFORD 5, CONN.**

"SUPER-SPACER"

FOR MILLING
GRINDING
JIG BORING
SLOTTING



POWER HACK SAW



**Low Priced Self-Contained
Portable Sturdy**

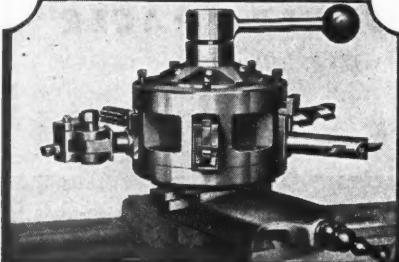
Ready to Work—Economical

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1111 SO. FERRY BLDG.
NEW YORK 4, N.Y.

Write for Bulletin No. 300

MILLER-KNUTH MFG. CO., OMAHA, NEB.

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5 TOOLS IN POSITION
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**AUTOMATIC MACHINE
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112 CHARLES ST. AUBURNDALE 66 MASS.

Logan 7-Inch Shaper

Production of a 7-inch shaper which can be quickly and easily set up for handling a wide variety of work, including straight cuts, angular cuts, squaring, machining and slotting operations, is announced by the Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill. Built entirely of steel and cast iron, with extra weight at vital points, and rugged



Logan 7-Inch Shaper

throughout, the machine is said to take heavy cuts smoothly with speed and accuracy and without chatter. An extra heavy cast iron crank plate provides ample power behind each stroke. Positive slip-proof operation, even on heavy cuts, is further assured by a roller chain drive, the manufacturer states.

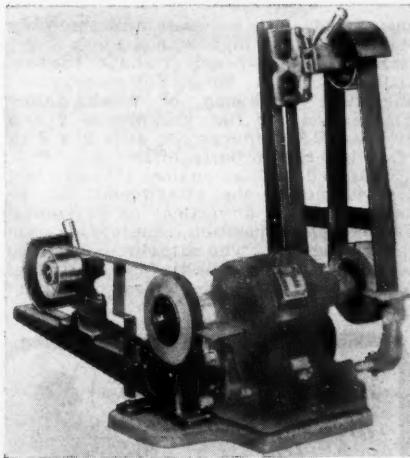
The Logan 7-Inch Shaper has a maximum stroke of 7½ inches and can be operated at any speed desired between 64 and 175 strokes per minute. The speed can be changed instantly without stopping the motor or shifting the belt. The ram is micro-set by a simple screw adjustment. Six automatic feeds from

0.002 to 0.12 inch are provided in either direction, with a half turn of the feed handle reversing the feed. The tool head may be swiveled and instantly reset to center by means of tapered locating pins.

Porter-Cable Type N-2 Light Belt Grinder Attachment

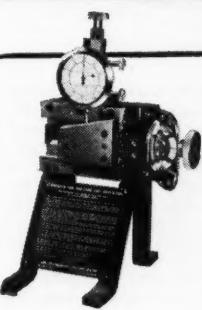
The Porter-Cable Machine Co., 300-7 Wolf St., Syracuse 8, N. Y., announces a light, narrow belt grinder attachment, designated as the Type N-2, for use in performing all kinds of light burring and grinding operations. Combining the versatility of platen grinding with the economy and speed of contact grinding, it is said to be ideal for the light grinding of flats, arcs and angles, gear burring, weld grinding, cleaning up operations, and so on, on a wide variety of composition and plastic materials, as well as steel, iron, aluminum, wood and glass.

Claimed to be especially useful in toolrooms, sheet metal shops, pattern shops, garages, electrical shops, assembly, repair and maintenance departments, or in any type of industry where light grinding and finishing operations are required, the Porter-Cable Type N-2 Grinder



Porter-Cable Type N-2 Light Belt Grinder Attachment

attachment is furnished without motor and can be quickly aligned and attached to the familiar bench type wheel grinder to which a resilient contact roll has



CLARKATOR CHECKS DIAL INDICATORS



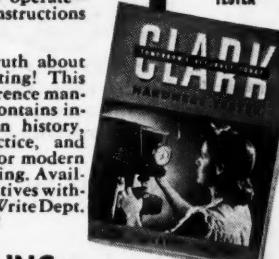
MASTER DIAMOND CHECKING SET

CLARK Gives Continued Accuracy, Rapid Measurements

THE CLARK has everything you want in a hardness tester—direct reading precision dial, durable construction, ease of servicing. Three standard models shipped complete with weights, dust protectors, diamond and steel penetrators, test blocks, and anvils.

CLARKATOR CHECKS DIAL INDICATORS with micrometer speed and sine bar accuracy. Easy to operate—just four simple steps. Complete instructions permanently fastened to base.

MASTER DIAMOND CHECKING SET eliminates hardness tester errors. Consists of a master diamond penetrator and two test blocks. Precision is assured over a long period because the set is used only for checking. Furnished in leather case.



CLARK INSTRUMENT, INC.

10200 Ford Road.

• Dearborn, Mich.

been fitted. The complete unit assembly stands 27 inches high with a width of 2½ inches. A 6 x 7-inch T-shape base is drilled with 3 holes for convenient mounting to bench or work table. Platen size for flat grinding is 2 x 4 inches. Resilient contact rolls 2 x 6 or 1 x 6 inches can be furnished.

Equipped with an endless abrasive belt 2 x 48 inches, the attachment can be used either in a vertical or horizontal plane or any position (angle) between the 90 degrees. The attachment is said to provide for unusually fast cutting as well as cool and vibrationless operation.

For
Fast, Accurate
Metal-Cutting
Use



KENNAMETAL CEMENTED
CARBIDE
TOOLS, BLANKS, and MILLING CUTTERS



KENNAMETAL Inc.
LATROBE, PA.

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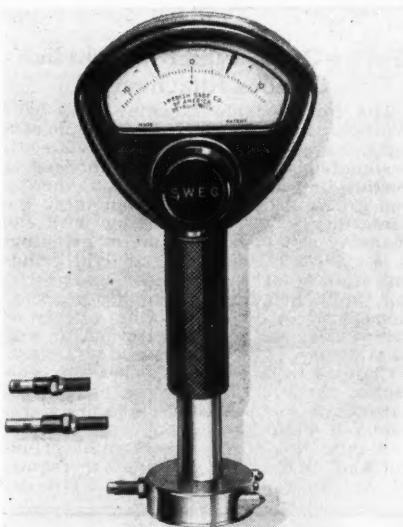
... because they're made of a special, correctly-heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

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Mikro-Internal Indicator

An application of the Mikrokator frictionless amplification to a standard internal indicator, the Mikro-Internal In-



Mikro-Internal Indicator

dicator illustrated herewith is announced by the Swedish Gage Co., 8900 Alpine, Detroit 4, Mich. The dial is graduated in 0.0001 inch and has a scale range of 0.006 inch. For closer tolerances, the dial can be obtained with a scale range of 0.0024 inch graduated in 0.00005 inch. The indicator is available in diameter ranges of ½ to 6 inches with a standard measuring depth of 4 inches.

Rapid-acting, sensitive, light, and compact with positive repeat readings.

SEND US YOUR PRINTS FOR Quotations

**THREAD GRINDING
BROACHING
MAGNETIC INSPECTION**



TAYLOR
MACHINE COMPANY
MANUFACTURERS OF
AVIATION & AUTOMOTIVE PARTS
Gear Specialists
1917 EAST 61st ST. • CLEVELAND 3, OHIO

the Mikro-Internal Indicator is said to be ideal for checking internal diameters for size, out-of-round, and taper, both in the shop and in inspection departments.

Brown Drill Press Converter

Any size or make drill press can, it is stated, now be instantly converted to perform filing, cutting, sawing, or slotting



Brown Drill Press Converter

operations through use of the Brown Drill Press Converter illustrated here-with, product of the Leo G. Brown Engineering Co., 1157 Riverside Drive, Los Angeles, Calif. It is claimed that the unit can be attached in three minutes and has only three moving parts.

Mounted between two preloaded ball bearings is a solid steel cam which converts the drill press rotary action to a vertical reciprocating action and is said to simultaneously increase the drill press power output approximately 300 per cent. The main housing is a high grade Duro-

TAPPING TIPS From Woody Spencer's Notebook

THE RAKE MAKES A LOT OF DIFFERENCE

The yard needed rakin' up the other Saturday afternoon and I couldn't find the leaf rake. You know what happened.

Had to dig the leaves out of the rake every sweep. It got me to thinkin' about specialized tools and (of course) taps in particular. Seemed to me usin' a garden rake was a good deal like tryin' to tap brass or cast iron with a tap ground for steel. It's hard goin'. Takes twice the work. Cuts, tears and spoils the thread, too. The only way to get a tapping job done is to use a tap made for the job. Ordinarily, taps designed for steel are not marked. But when the boys ask us, we're glad to mark the taps designed for other materials. No extra charge, either.



Woody Spencer's Tapping Tips aren't published to supply technical information on tapping problems. They merely aim to help with hints, suggestions or short cuts that someone has found handy in making routine tapping jobs go a little smoother or quicker.

For technical information and suggestions on specific problems, send us complete details of the job . . . material, diameter, depth, whether the hole is through or blind, lubricant, etc. Our engineers will be glad to give you definite suggestions covering your problem.

NOTE: Woody Spencer's Tapping Tips will appear here as often as Woody gets time to write them up. Look for them.

Woody Spencer's Handy Tap guide is packed with useful information on tapping. It's free. Write for your copy on the Company letterhead.

THE RIGHT TAP AT THE RIGHT TIME



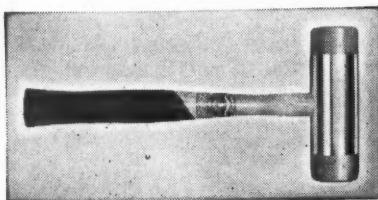
The Woody Spencer Company
Cleveland 3, Ohio

metal casting with bronze sleeve insert for bearing surface. The cam roller is hardened tool steel.

The Brown Drill Press Converter is available in 1 and 1½-inch stroke models.

Danielson Nylon Hammer

A "soft" hammer with faces of nylon for industrial and home use is now being manufactured by the Danielson Manu-



Danielson Nylon Hammer

facturing Co., Danielson, Conn. The hammer, it is claimed, is designed to wear long, handle easily, resist chipping

or mushrooming, have no rebound, resist fire, chemicals, and oils, and to not heat up or change in shape under continued use.

The Danielson Nylon Hammer has an attractive bright smooth finish with no projecting surfaces. The nylon faces are replaceable and, when inserted into the hammer head, become locked in place by a patented head construction. The hammer is designed for machine shop, repair shop, automotive, aviation use, as well as homecraft, home repair work, and model building. It is available in 2/3 and 2-lb. weights.

Michigan Standardized Cone-Drive Speed Reducer

Built around double enveloping Cone-Drive gearing, a compact speed reducer of standardized design is announced by the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. The unit is available in various models to meet practically every requirement, including models with pinion under, pinion over, and with gear shaft vertical. Center distances range from 2 to 18 inches.

**CLEAR-CONCISE
NAMEPLATE MARKING**

**EASILY—
QUICKLY!**

MODEL No. 4

The nameplate on your product is your signature; keep it neat and legible! Accurate location and alignment are assured with this NAMEPLATE DETAIL PRESS. Write for particulars.

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- Perfect Alignment
- Uniform Depth

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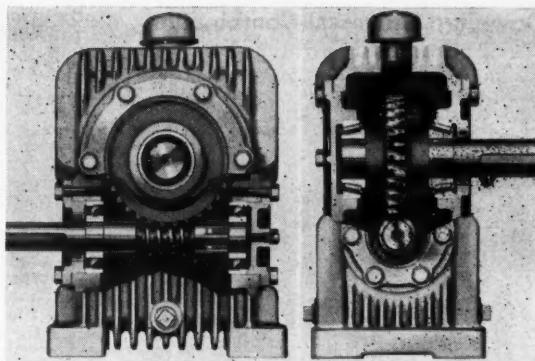
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of any material

Abart GEAR & MACHINE CO.
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Cutaway views of Michigan Standardized Cone-Drive Speed Reducer showing the double enveloping gearing employed in the construction



Standardized Cone-Drive gear sets and standardized Cone-Drive pinion and gear mountings are used in all models. Assemblies are either right or left hand. Available ratios range from 5:1 to 70:1. Extended pinion and gear shaft models are also available. A particular advantage is the fact that all parts for any model of given size are interchangeable.

The design of the Michigan Standardized Cone-Drive Speed Reducer includes cooling fins which are said to step up thermal capacities, thus assuring unusually long service life from the gear set and bearings due to lowered operating temperatures. The fins also serve to further increase the rigidity and ruggedness of the housing. All standard Cone-

Drive reducers from 4 to 18 inches center distances inclusive can be equipped with water-cooling coils to provide increased thermal capacity. The finned housings are of the box type, resulting in a large oil capacity for lubrication and for heat conduction. Splash type oiling is employed on all models. Housings are further reinforced internally at all points of stress so as to ensure correct bearing and shaft alignment under all load conditions.

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MASS PRODUCTION
Will Speed up Drilling
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A. S. A. STANDARD PRECISION DRILL JIG BUSHINGS

Standard sizes and styles in stock for prompt delivery.
Write for catalog showing table of standard sizes of bushings with
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CHICAGO, ILL.
Prescott Production Tool Co.
ARmitage 3364

HOUSTON, TEXAS
Chickering Tool & Equipment Co.
W-6-8584

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Main 6526

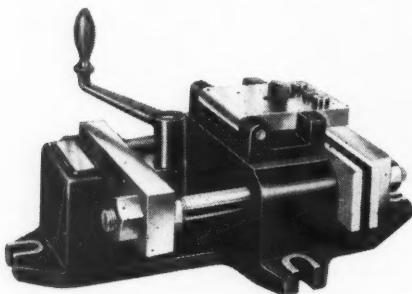
LOS ANGELES, CALIF.
Walter W. Miller
PROspect 2467

*Stock carried at these locations
ACCURATE BUSHING COMPANY, 440 North Ave.; GARWOOD, N. J.

WEstfield
2-2415

Downing Universal-Combination Milling and Drilling Vise

A universal-combination milling and drilling vise which is designed to clamp work with a single stroke of the operat-



Downing Universal-Combination Milling and Drilling Vise

ing arm is now being marketed by the Downing Engineering Co., 807 S. Main St., Dayton 2, Ohio. All parts of the unit are made to close tolerances and care-

fully inspected prior to assembly. Space is provided to assure ease of loading and to eliminate the piling up of chips under the part being machined. Clamping pressure can be easily adjusted.

All locating and milling is effected against the solid body of the vise so as to assure the production of precision parts. The drill jig bracket included in the design of the unit is made of Strenes heat-treated metal and ground. It is located by means of hardened bushings and dowels on the top of the solid body, thus ensuring the production of accurate parts and eliminating excess scrap. The vise jaws are located by means of a dowel for maximum accuracy in holding parts for drilling and milling.

The Downing Universal-Combination Milling and Drilling Vise is made in three models having a jaw openings of $\frac{1}{2}$, $\frac{3}{4}$, and $1\frac{1}{2}$ inches respectively.

DoAll Spray Lubricator for Band Saws

Designed to provide an economical and clean method of heat dissipation, a unique spray lubricator for attachment to its high speed band saws is announced.

For EFFICIENT Dust Collection



Model R-400. Fifteen filter tubes. Fits limited space. Easily installed. 1 1/2 h.p. motor. 1540 c.f.m. at 5500 l.f.m., static pressure 3 1/2".

TORNADO

WHEREVER grinding, buffing, polishing or other operations cause fine dusts or lint, use the TORNADO Dust Collector, noted for its efficiency. Large filter surface. Exhausts clean air. Collects finest dusts or large, heavy particles. Improves health. Increases production.

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and demonstration

BREUER
ELECTRIC MFG. CO.
5114 N. Ravenswood Ave.,
CHICAGO 40, ILL.

**Band Saw Equipped with
DoAll Spray Lubricator**

ed by The DoAll Co., 1306 Washington Ave., S. Minneapolis 4, Minn. Simple to install, the attachment is described as a rugged, heavy duty, foolproof device which can be operated from the standard air pressure line available in the average shop.

The spray head straddles the saw blade from the rear edge and directs twin streams of lubricated air against the teeth of the saw. Lubricant is thus forced under pressure in the form of a metered mist into the saw teeth as it enters the work. The coolant flow is regulated by a metering valve. The installation of the lubricator is effected in such a manner that the work table does not become wet or soiled, the manufacturer claims.



While designed primarily for use in cutting non-ferrous metals, the DoAll Spray Lubricator is said to work equally well in cutting many types of plastics and laminated material where friction between the blade and work softens the material to a gummy state.

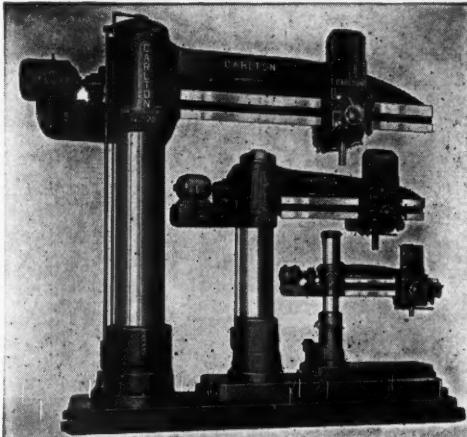
Features:

1. All ball-bearing throughout
2. Low-Hung Drive to Spindle
3. Quiet running at all speeds
4. Requires oiling only every six months
5. Concentrated and convenient control
6. Constructed on unit principle

MADE IN SIZES OF

7. 3 feet to 12 feet inclusive arm lengths
8. 9 inch to 26 inch column diameters.

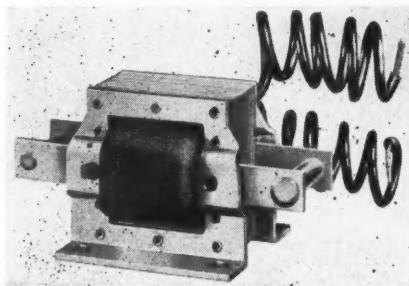
CARLTON RADIAL DRILLS



THE CARLTON MACHINE TOOL CO.
CINCINNATI 25, OHIO, U. S. A.

Barnes Midget-Size Solenoid

Engineered for long life and trouble-free service, the Barnes Midget-Size Solenoid shown in the accompanying il-



Barnes Midget-Size Solenoid

lustration is now being marketed by the John S. Barnes Corp., 301 S. Water St., Rockford, Ill. The design includes specially treated coils which are said to be unaffected by oil or coolant. The extra heavy feet and side plates of the unit

are made integral so as to provide for maximum strength and rigidity. Phosphor bronze plunger guides are said to afford ideal bearing surfaces.

Compactly constructed, the Barnes Midget-Size Solenoid can be readily adapted to a wide variety of applications. Sufficient force is said to be exerted for actuating most pilot valves and other control structures. The solenoid is available in both push and pull types for operation on alternating and direct current.

Linderman Tension Brake

A brake which is designed to apply accurately controllable continuous tension in industrial machinery has been announced by Linderman Devices, Inc., Newburgh, N. Y. Available either as a self-contained unit or for building into equipment under design, the brake includes features which make it suitable for applying continuous retarding force, these being the absence of self-energizing action (permitting accurate control of tension desired); ability to apply even heavy loads under ordinary factory airline pressure; radial shoe actuation, eliminating sensitive adjustments and

Mac-it ALLOY STEEL SCREWS

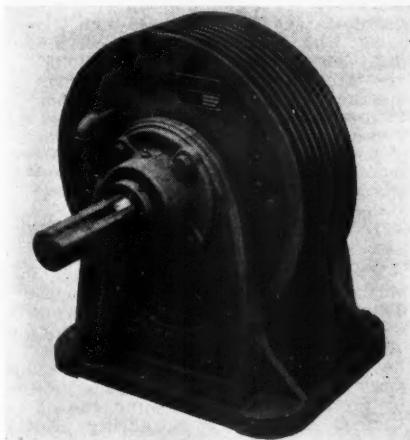
Greater strength, more compact
design with
SOCKET HEAD CAP SCREWS!

Mac-it Socket Head Cap Screws will give you added holding power and permit more compact design where necessary. All Mac-it screws are heat-treated and accurately made with die-cut threads. Whatever your needs, let the complete Mac-it line serve you. Sold through recognized distributors from coast to coast and in Canada.

DISTRIBUTED NATIONALLY BY
STRONG, CARLISLE & HAMMOND COMPANY
CLEVELAND 13, OHIO
MANUFACTURED BY
MAC-IT PARTS COMPANY LANCASTER, PA.

high pressure areas; and use of 90 per cent of the drum area for braking.

In operation, the amount of tension desired is accurately obtained and maintained by merely setting the air pressure regulating valve in the lead from the factory air line. Slight increases or decreases in tension are obtained by merely



Linderman Self-Contained Tension Brake

changing the gage setting, since the amount of braking effort is directly proportional to the air pressure applied. Shoes are self-equalizing, full floating, with no localized high pressure areas on lining or drum, it is claimed.

As shown in the accompanying illustration of the self-contained type of brake, drums are heavily finned to provide maximum heat dissipation under continuous application. If desired, fan cooling can also be provided, the brake assembly being enclosed within an annular sheet metal housing in such an event. The brake may be operated with equal efficiency in either direction.

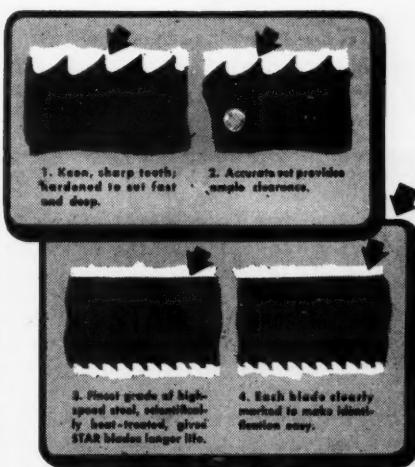
Application of shoe pressure to the drum is through multi-stage steel diaphragms—one for each shoe. These diaphragms make it possible to use a minimum of expansion, since the shoe travel obtained is the sum of the expansions of each stage of the diaphragm.

Brake shoes incorporate a wedge mechanism to adjust for lining wear. The only parts requiring occasional lubrication are the adjustment screws and the shaft bearings.

To: Hack saw users A WORD OF ADVICE

Buy STAR Blades
FOR
faster cutting
FOR
cleaner surface
AND
they last longer
HERE'S WHY

FREE — STAR Metal Cutting handbook gives valuable instructions on selection, use, and care of hack saw blades.



**SOLD THROUGH
LEADING DISTRIBUTORS**



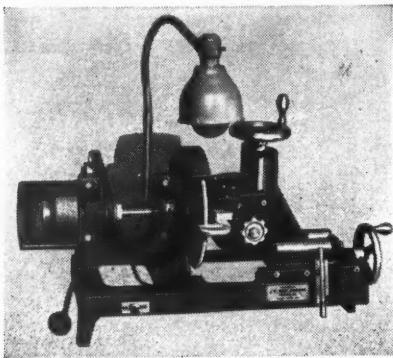
CLEMSON

CLEMSON BROS., Inc., Middletown, N.Y.

Makers of hand and power hack saw blades,
frames, metal cutting band saw blades and
the Clemson D-17 lawn machine.

Moore Pipe Wrench Grinder

A complete grinding unit for resharpening dull pipe wrenches is announced by J. C. Moore Industries, P. O. Box 234.



Moore Pipe Wrench Grinder

Fredonia, Pa. The unit is constructed of gray iron castings and has a two-tone enamel finish. Outstanding fea-

tures include a grease-sealed ball bearing mandrel and spacing mechanism which provides spacings of 4, 5, 6, 6½, 7, 8, 9, 10, and 12 per inch.

Additional features of the Moore Pipe Wrench Grinder include a pulley and belt on the mandrel; variable pitch motor pulley; built-in and ready-wired motor switch; adjustable light; wire cleaning brush; face grinding wheel; 3 special grinding wheels for 6 to 48-inch wrench jaws; and special patent wheel mounting. Accessories available include a special holder for all handles, mandrel spanner wrench, two Allen wrenches, $\frac{1}{2}$ -inch square abrasive stick, mounted diamond wheel dresser and two guides.

Tubular Over-the-Bar Inside Micrometer

Measuring bores without removing boring bars is said to be possible with the Tubular Over-the-Bar Inside Micrometer now being manufactured by the Tubular Micrometer Co., St. James, Minn. The device can be used to determine bore sizes over or around center obstructions by merely placing it around the boring bar in the correct measuring position.



● The Almond Three Jaw Drill Chucks were the first to be placed on the market. They were Pioneers in the field of Drill Chucks!

ALMOND THREE JAW DRILL CHUCKS are furnished in 9 sizes with capacities from $3/16''$ to $1''$. These are made in heavy and light duty types with a taper arbor hole or with a threaded arbor hole. For Portable Drills.

Write for Complete Details

• • SINCE 1872 • •



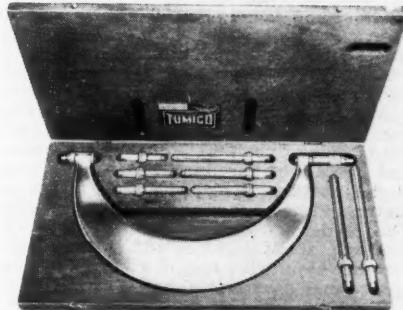
T. R. ALMOND MFG. CO.
ASHBURNHAM MASSACHUSETTS

and reading the micrometer.

The micrometer is made with a hollow-box type steel frame which provides for rigidity together with structural lightness, thus making the device easy to handle. To ensure minimum expansion and contraction, the frame has a vacuum in the center. According to the manufacturer, hand heat will not affect the micrometer reading since it is dissipated in the vacuum and does not distort or follow the metal frame. The frame is hydrogen brazed and is plated with copper, nickel, and heavy chrome to resist wear and perspiration.

The spindle of the unit is made of hardened and ground tool steel. Micro-meter threads are ground from the solid and lapped to a true fit with the barrel. Graduations on the barrel and thimble are sufficiently large to ensure easy reading. Should the micrometer become worn through excessive service, the spindle bushing, mandrel, and thread can be adjusted to provide for constant accuracy and alignment.

The Tubular Over-the-Bar Micrometer is available in standard sizes from 8 to 28 inches for accommodating bar diameters from 4 to 8 inches. Special tubular micrometers for larger size bores may be obtained on order. Micrometers are fur-



Tubular Over-the-Bar Inside Micrometer

nished complete with necessary mandrels and adjusting wrenches, packed in protective well-finished hardwood cases.

Wyco Universal Hy-Speed Grinder

Manufactured by Wyzenbeek & Staff, Inc., 838 W. Hubbard St., Chicago 22, Ill., the Wyco Universal Hy-Speed Grinder shown herewith can be set up on a

2, 3 & 4
SPINDLE

Popular standard adjustables for holes equally spaced on varying circles. Three-spindle heads available for holes equally spaced in a straight line. Recommendations for standard or special drillheads made promptly and without obligation.

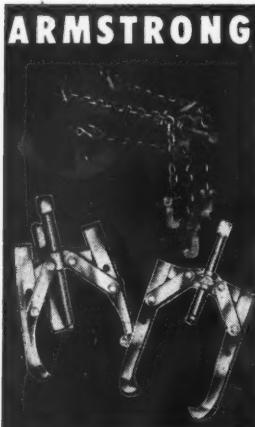
FULL BALL BEARING
*Adjustable
Drillheads*

THRIFTMASTER

DETROIT REPRESENTATIVE: R. S. PARSON, 2349 FENKELL AVENUE
THRIFTMASTER PRODUCTS DIVISION THOMSON INDUSTRIES, INC.
25-27 Myrtle Avenue, Long Island City 1, New York

bench, hung from a hook, or suspended from the operator's belt in case he desires complete mobility.

The grinder is made in three sizes for light, medium, and constant duty in the high speed grinding, burring, filing, sanding, and polishing of work. The Model 00-U is equipped with a $\frac{1}{4}$ h.p. motor and has a free speed of 16,000 r.p.m. The Model 000-U2 is equipped with a 1/10 h.p. motor and has a free speed of 1,800 r.p.m. The Model 000-U1 has a free speed of 15,000 r.p.m. Motors are of the Universal a.c.-d.c. type with toggle switch in base and rubber cord and plug.



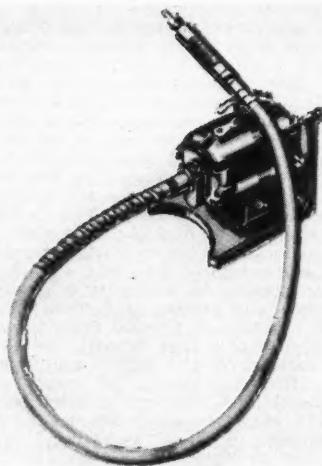
ARMSTRONG-BRAY GEAR and WHEEL PULLERS

12 types
40 sizes

Correctly de-
signed with
non-slipping

drop forged steel arms, STEELGRIP gear and wheel pullers save time, prevent breakage and resultant loss and delay. Standard and special 2-arm and 3-arm pullers and the universal CHAINGRIP PULLERS in 4 capacities. Write for catalog.

ARMSTRONG-BRAY & CO.
5346 Northwest Highway, Chicago 30, U.S.A.



Wyco Universal Hy-Speed Grinder

The flexible shaft of the Wyco Universal Hy-Speed Grinder is provided with an oilproof synthetic rubber casing and is innerlined with non-metallic graphite impregnated Wyco Innerliner to ensure a vibrationless true-running shaft. Hand-pieces are said to be cool running and are equipped with precision ball bearings and interchangeable collets.

Acromark No. 920 Hand-Operated Bench Type Marking Machine

Said to offer a simple, economical means for marking flat parts, the Acromark No. 920 Hand-Operated Bench Type Marking Machine illustrated herewith is now being marketed by The Acromark Co., 9 Morrell St., Elizabeth 4, N. J.

The use of BURDICK GAGES will reduce TAP BREAKAGE



Plain Dualgage

Write for Bulletin
BURDICK DUALGAGES

Reversible Type
PLUG GAGES



Thread Dualgage

Dualgages for use in our new universal gage handle.

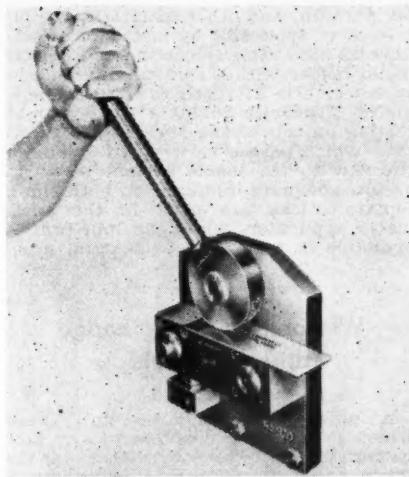
We also make

RINGS — PLUGS — THREADED OR PLAIN — CYLINDRICAL THREAD ROLLING DIES

230 W. HURON ST.

THE S. J. BURDICK COMPANY

CHICAGO 10



Acromark No. 920 Hand-Operated Bench Type
Marking Machine

By making an adjustment, the machine can also be used to mark round parts.

The Acromark No. 920 Marking Machine is constructed from a heavy gray iron casting having a steel stud at the top to accommodate a sleeve bearing mounted roller marking die. The die has a hole for a handle that is used in rolling the mark into the flat part as it passes over a double-row precision ball bearing held in the adjustable arm. The arm is hinged by a shaft through the frame at one end and at the other end it is bolted to the frame through an elongated hole or slot, thus permitting adjustment. Fine working adjustment is obtained by means of a screw and lock nut located beneath the locking bolting end of the arm.

Said to readily produce four lines of markings in untempered steel, stainless steel, or other material, the Acromark No. 920 Marking Machine is claimed to be particularly efficient for marking scales used on machines, for trade marking, and name and instruction marking.

Elf Dry Lubricant

According to the Monogram Manufacturing Co., Los Angeles, Calif., the life of drills and band saw blades can be

BAUMBACH
THE DIE SET AUTHORITY

All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing Leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

E. A. BAUMBACH MFG. CO.
1806 S. KILBURN AVE. CHICAGO 23, ILL.

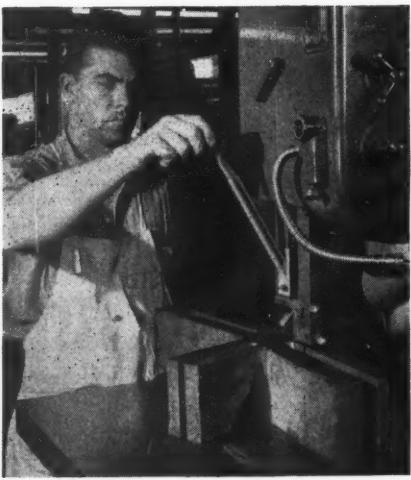
PRODUCERS OF SCREW MACHINE PRODUCTS TO SPECIFICATIONS

We have:

ONE, FOUR and SIX spindle automatics maximum capacity 2 $\frac{5}{8}$ " round. Hand Screw Machines and Universal Turret Lathes maximum capacity 3" round. Castings and forgings machined maximum 10" diameter, 8" length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

WRITE FOR ESTIMATE

SCREW MACHINE SPECIALTY CO., • 5700 Butler St., Pittsburgh 1, Pa.



Automatic Applicator for Elf Dry Lubricant

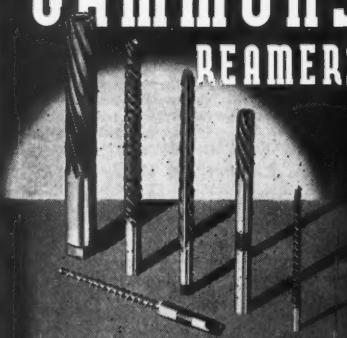
tripled by the use of the Elf Dry Lubricant now being distributed by this firm. Compounded of turpentine, mineral

oil, paraffin, and other materials, the lubricant is applicable by means of an automatic applicator consisting of a square metal holder with a slot running lengthwise which is attached to the band saw guard. The slot guides a small weight resting on top of the stick of the lubricant which passes between the teeth of the saw to the inside surface so as to assure adequate lubricant on both sides. Square sticks are used in the automatic applicator, while the lubricant is available in packages for manual uses.

Wisconsin Quick-Change Adjustable Multiple Drill Head

A quick-change multiple drill head which is readily adjustable to any hole pattern is now being marketed under the trade name of Wisconsin by Strutz & Mead, Inc., 1225 N. Water St., Milwaukee 2, Wis. In the head, which is entirely gear driven, each drill revolves completely around two different centers, each with $\frac{1}{2}$ -inch radius. Thus, each drill point can be located and locked at any point in the area of a $3\frac{1}{4}$ -inch circle.

GAMMONS REAMERS



Manufacturers of

The Gammons Helical Taper Pin Reamer
The Gammons Helical Chucking Reamer
The Gammons Helical Job Makers Reamer
The Gammons Duplex Taper Pin Reamer
Special reaming problems invited
Send for Catalog

THE GAMMONS-HOAGLUND CO.
MANCHESTER
CONNECTICUT

MILWAUKEE SURFACE PLATES

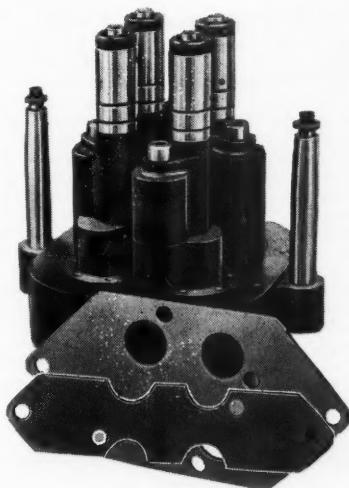


36" x 48" . . . semi-steel . . .
accurately machined. Securely
mounted cast legs are machined and provided
with adjusting screws for perfect alignment.
Shipping weight, 1300 lbs. Also larger or
smaller plates with planed or scraped surface.
We also manufacture angles and parallels as
shown underneath surface plate.
Write for details.

J. C. BUSCH CO.
Engineers and Machinists Since 1907
26 E. PITTSBURGH AVE. MILWAUKEE, WIS.

Since each circle overlaps at least one other circle, the infinite variety of hole patterns which can be produced is limited only by the number of spindles employed and the combined area of the various spindle circles.

An additional advantage of the Wisconsin Quick-Change Drill Head is the



Wisconsin Quick-Change Adjustable Multiple Drill Head

fact that a set of templates is furnished for every hole pattern or bolt circle which the user may wish to drill. Additional templates for new hole patterns are readily available.

Each set of templates consists of a positioning template and a locking template. The positioning template has half holes which permit the spindles of the drill head to be quickly and easily swung into position. The locking template is then placed over the spindles and bolted to the template support posts, and the individual spindle lock nuts are tightened.

The Wisconsin Quick-Change Drill Head is made in standard models with from 2 to 6 spindles. Minimum centers are $1\frac{1}{8}$ inches and maximum bolt circles are $8\frac{3}{4}$ inches in diameter. The design of the drill head enables it to be mounted on most standard drill presses without special tools. Adapters are furnished for any standard make of drill press.

for Better Belt Joints



To keep belts in service longer, use only GENUINE Clipper Belt Hooks applied with Clipper Belt Lacers.

use Clipper Belt Hooks

Clipper Hooks are made of the finest quality wire—**BETTER** than ever before—produced for our exclusive use. Hooks hold with firm, sure grip — give longer satisfactory service.

and Clipper Belt Lacers!

The Clipper No. 9 Portable Lacer laces belts up to 6 inches wide in one quick, easy operation. Under powerful pressure hook legs are embedded flush with the surface of the belt and points clinched, making a perfect joint.

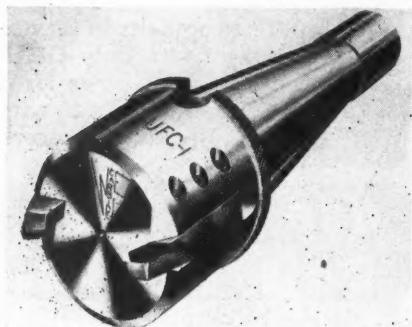
Phone your mill supply jobber for a demonstration!

CLIPPER BELT LACER COMPANY, Grand Rapids 2, Michigan, U.S.A.



Wendt-Sonis Universal Fly Cutter

Unusually long service life and ready adaptability are features claimed for the Wendt-Sonis Universal Fly Cutter illus-



Wendt-Sonis Universal Fly Cutter

trated herewith, product of the Wendt-Sonis Co., Hannibal, Mo. The cutter can be used for all types of ordinary and step-milling operations on a wide variety

of materials.

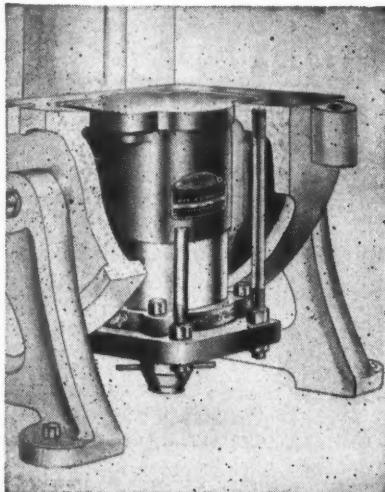
The construction of the cutter body is such that the inserted teeth can be easily interchanged in performing numerous milling jobs. Moreover, blades may be easily removed for sharpening on an ordinary bench grinder.

G-E Shrinkable Plastic

A plastic material that is made to shrink on the handles and grips of pliers, wrenches, and wire cutters to serve as an electrical insulator is announced by the General Electric Co., Pittsfield, Mass. Tough and durable, the material is applied after it has been immersed in a special dilator solution which causes it to expand half again its normal size. When thoroughly dry, it shrinks to smaller than its original size to form a tight fit over the handles.

The plastic is available in cap and sleeve form for the application in diameters up to 1 inch and in any length. The fact that it swells to half again its normal diameter plus the fact that it can be stretched considerably while in the swollen state allows for the covering of larger diameters.

According to the manufacturer, the



Die Cushions for Every Punch Press Requirement

For deep drawing operations.

For pressure pad control on form dies.

For stripping blanks and ejecting slugs.

Write for Engineering
Catalog No. 100-12.

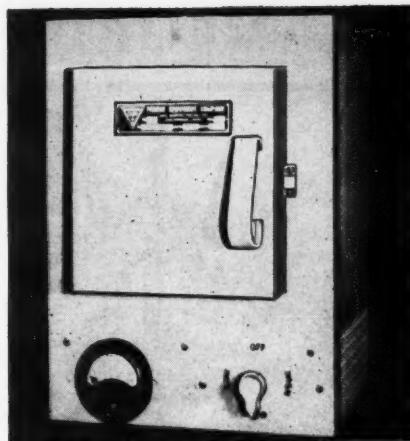
**DAYTON ROGERS
MANUFACTURING CO.**
Minneapolis 7, Minnesota

plastic is unaffected by temperature and humidity. In the swollen state, it is unusually tough and will not split or crack when being applied, it is stated. The caps and sleeves are shipped dry. To preserve, the caps and sleeves can be put in sealed containers until they are placed in the dilator solution, but actually they can be left in or out of the dilator indefinitely, the manufacturer claims.

Pereco Model 220-W Heat-Treating Furnace

Utilizing temperatures up to and including 1,850 deg. F., a versatile heat-treating furnace for small workshops and laboratories has been brought out by the Pereny Equipment Co., 842 N. Pearl St., Columbus, Ohio. Designated as the Pereco Model 220-W, the furnace is applicable to the heating of plastics, heat treating of metals up to its maximum range, porcelain enameling, jewelry enameling, laboratory control work, and so on, in addition to ceramics.

Designed for use by inexperienced operators, the furnace, which can be used for either laboratory or production work,



Pereco Model 220-W Heat-Treating Furnace

is well insulated and is equipped with a wall-thick hinged door and resistance wire-bound embedded heating elements. The unit is constructed for operation on 115 volts, drawing 1,500 watts.

SAVAGE NIBBLING MACHINE FOR TUBE SLOTTING, TUBE SHAPING AND CUTTING FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE

For fast, accurate work requiring a true edge and a clean cut.

Cutting Capacities:

Flat mild sheets $\frac{3}{16}$ "
Tough alloys $\frac{5}{16}$ "

Tubing:

Wall thickness to $\frac{1}{8}$ "
1" I.D. to 36" O.D.

Tube cutting attachment

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Manufactured By

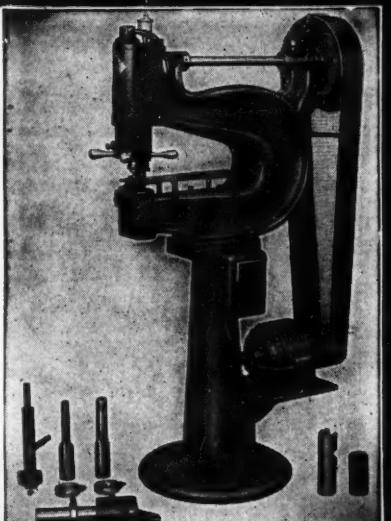
W. J. SAVAGE COMPANY

Since 1885

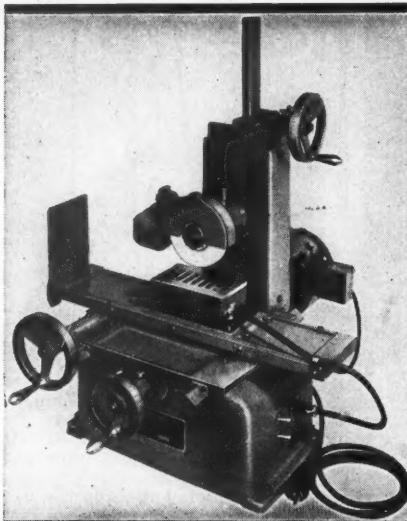
KNOXVILLE

Pioneer Manufacturers of Nibbling Machines

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HIGH SPEED BENCH SURFACE GRINDER

ACCURACY WITHIN .0001

A sensitive, highly accurate, machine specially designed

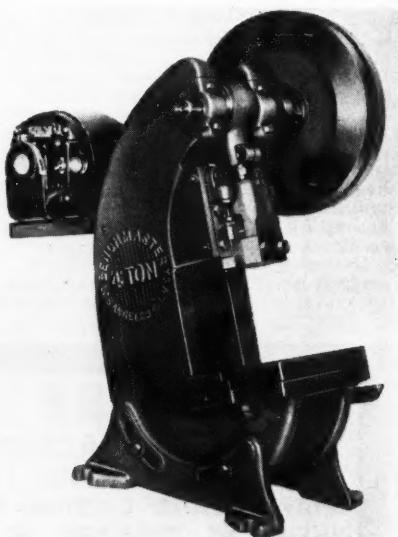
*"For The Job That
Fits in Your Palm"*

Write for Bulletin

SANFORD MFG. CO.
1020-28 COMMERCE AVE.
UNION • NEW JERSEY

Benchmaster Four-Ton Bench Punch Press

An unusually compact four-ton bench punch press which is said to be equally well adapted to performing stamping, marking, punching, crimping, riveting, and other high-speed production operations is now being produced by the Benchmaster Manufacturing Co., 2952 W. Pico Blvd., Los Angeles 6, Calif. Weighing 215 lb., the press is designed for operation at a speed of 285 r.p.m. and



Benchmaster Four-Ton Bench Punch Press

is equipped with a 1,725 r.p.m. electric motor.

Features of the machine include a precision ground shaft that is keyed by means of a press fit to a large eccentric, thereby offering a shock-absorbing bearing surface with no weak or thin points to shear or fail, the manufacturer claims. An oversize bronze bushing encloses the eccentric, and full diameter bronze bushings encase the shaft at wear points. The frames are cast in one piece from semi-steel, heat treated and heavily reinforced at stress points, and are mounted on two supports forming a broad stand cradle which permits the machine to be inclined for maximum versatility in operation.

An additional feature of the press is an open back which enables work to be inserted from the front as well as from the sides of the machine. To assure maximum power delivery at all times the unit is provided with a floating motor mount which is designed to maintain proper tension of the V-belt drive.

With the ram in up position, the press has a die space of 5 $\frac{1}{2}$ inches. The 6 x 8-inch bolster plate has a thickness of 1 inch and a 2-inch hole in its center. The flywheel has a weight of approximately 50 pounds.

Bay Tool and Work Stand

Made with heavy gauge steel shelves and heavy angle iron legs, a tool and work stand which can be used as a parts and tool container and transporter, assembly line parts container, stock pick-up and transportation unit, and so on, is now being manufactured by Bay Inc., 3015 N. 16th St., Philadelphia 32, Pennsylvania.

The unit is finished in olive green baked enamel and shipped knocked down in a carton with nuts and bolts for quick assembly. It is available with or without



Bay Tool and Work Stand

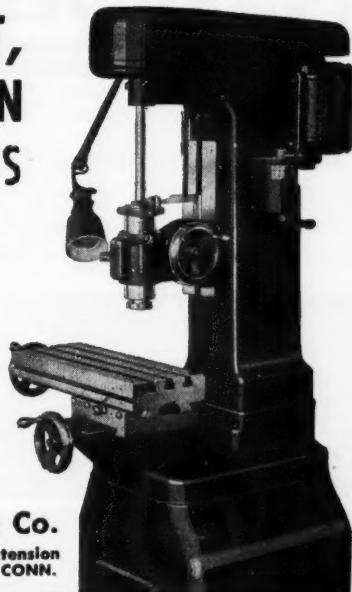
casters. The stand is 18 in. wide x 30 in. long and measures 30 in. high without casters and 32 $\frac{1}{2}$ in. with casters.

LINLEY . . . FAST, ECONOMICAL ON SMALL, FUSSY JOBS

Here's a compact miller and jig borer that earns its cost many times over by clearing busy tool rooms of work on small dies, jigs, fixtures, patterns and models. Saves larger machines for their rated jobs.

Consider Linley's 8 spindle speeds to 4250 r.p.m. . . . careful balance of all rotating parts . . . fast setup and easy changeover. Requires only 2 $\frac{1}{2}$ sq. ft. of space, yet has ample 7" x 17 $\frac{1}{2}$ " table size.

Informative Bulletin on request.



LINLEY Brothers Co.
661 State St. Extension
BRIDGEPORT 1, CONN.

Island Rotary Accumulating Table

Designed to provide a reserve reservoir for accommodating excess items being handled on a conveying system when the feed of the conveyor is greater than the operating equipment or the personnel capabilities of taking care of same, the Island Rotary Accumulating Table illustrated herewith has been placed on the market by the Island Equipment Corp., 101 Park Ave., New York 17, New York.

The table comprises a unit with a square base and round flat disc steel top supporting a revolving disc on which the bottles, cans, or other materials being

conveyed rest. The disc can be automatically motor driven at any desired speed in order to accurately synchronize with



Island Rotary Accumulating Table

immediate delivery

ADAMAS

**CEMENTED
CARBIDES**

FOR METAL CUTTING AND WEAR RESISTANCE

Standard and Special
Shapes and Grades

ADAMAS CARBIDE CORPORATION
Producers of Cemented Carbides in All Forms
40-30 23rd STREET
LONG ISLAND CITY 1, NEW YORK

the speed of the conveyor. Being round, the table permits a number of operators to work around it at one time. The outer edge of the disc top is provided with a guard plate which is designed to prevent the contents of the disc from falling off.

USE SCHMARJE
CARBIDE-TIPPED
HIGH PRODUCTION TOOLS

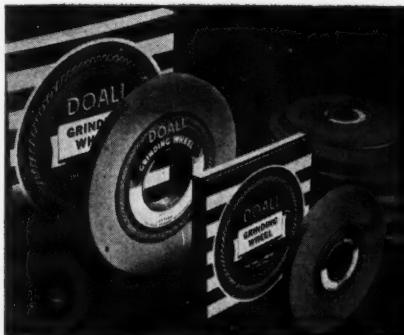
SCHMARJE TOOL AND ENGINEERING CO.
MUSCATINE, IOWA

DoAll All-Purpose Grinding Wheel

The DoAll Co., 1301 Washington Ave., S., Minneapolis 4, Minn., announces an all-purpose grinding wheel for grinding any kind of material, including hardened alloy tool steel, annealed steel, stainless Monel, bronze, aluminum, brass, and hard plastics. The wheel is said to work equally well for heavy fast roughing cuts and fine finishing and can be used on all types of grinding machines including surface grinders, centerless grinders, cylindrical grinders, tool grinders, and pedestal type grinders. No alteration of the machine is necessary, and the cutting rate is limited only by the ability of the grinding machine.

As a result of the unique cutting crystals and method of bonding used in the DoAll All-Purpose Grinding Wheel, unusually heavy cuts without sacrifice of surface finish or accuracy can be made, the manufacturer states. The effective cutting edges of the crystals are said to be broken down at a very slow rate, thus resulting in long life to the wheel and infrequent dressing. The structure is such that loading even when grinding soft materials is reduced to a minimum.

According to the manufacturer, the bond used in making the wheel is insoluble and prevents the wheel from weaken-



DoAll All-Purpose Grinding Wheels

ing when used with coolants in wet grinding. On the other hand, the open structure is such that the work is said to remain cool even when dry grinding. The wheel is available in three types designated as the No. 1 (straight), No. 5 (recessed one side), and No. 7 (recessed two sides). Sizes range from $\frac{1}{4}$ to 14 inches in diameter by $\frac{1}{4}$ to 3 inches in thickness. Any size arbor hole is available.

BENDS PIPE EASILY and QUICKLY at FIXED RADII

"American"

Cold Pipe, Conduit and Tube Bending Machines

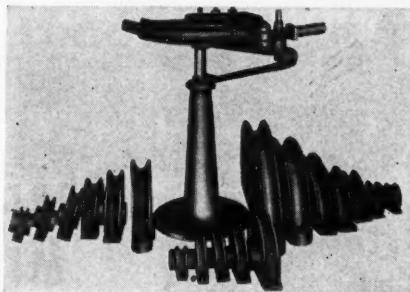
Twelve types to select from. Hand operated capacities $\frac{1}{4}$ " to 6" inclusive. Motor operated $\frac{1}{2}$ to 8" inclusive.

A few of our More Than 12,000 Customers:

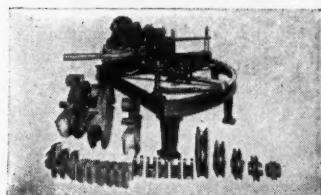
Bureau of Ships, Wash., D. C.; Henry J. Kaiser Co., Pacific Bridge Co.; Bethlehem-Hingham Shipyards; Hercules Powder Co.; Stone & Webster; E. I. Du Pont de Nemours & Co.; Westinghouse Elec.; General Motors; Henry Ford Co.

Quick Deliveries
"American"
PIPE BENDING MACHINE
Company INC.

Factory and Main Office: 14 Furnace St., Poultney, Vermont

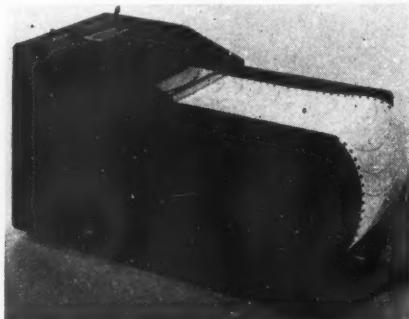


Write Air Mail for printed matter



Profilometer Reading Recorder

For individuals requiring a written record of the surface roughness measurement of a part, the Profilometer Reading Recorder shown herewith has been



Profilometer Reading Recorder

developed by the Physicists Research Co., Dept. 6, Ann Arbor, Mich. Operating as an attachment to the company's Profilometer, the reading recorder provides a continuous chart record of the

average roughness of the surface being measured.

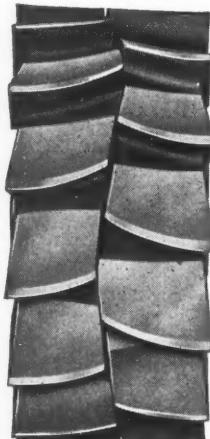
The charts, which are read in micro-inches like the Profilometer micro-inch meter, are useful in obtaining more detailed information on surface roughness, such as the location of rougher or smoother areas and in supplying customers with records of the surface finish on parts delivered to them.

The recorder is designed for attaching at the meter jack provided on all Profilometers. No adaptations of existing Profilometer equipment are necessary.

Red-E Special Floating Type Live Center

Product of The Ready Tool Co., 550 Iranistan Ave., Bridgeport 5, Conn., the Red-E Special Floating Type Live Center, is designed to ensure accuracy in sharpening piloted reamers.

In performing the sharpening operation, the procedure is to first adjust the expansion plug of the reamer so that the highest micrometer reading obtainable is from 0.002 to 0.004 inch over the nominal size. The amount of oversize involved



PATENTED

**ENJOY THE SATISFACTION OF
SUPERB PERFORMANCE**

With

Aber CURVED TOOTH Milling Cutters

**Maintain That Width With the
"CHATTERLESS FLOWING ACTION"
of a Curved Tooth Overlapping
Side Milling Cutter.**

SEND FOR CIRCULARS

ABER ENGINEERING WORKS, Inc., Waterford, Wis.

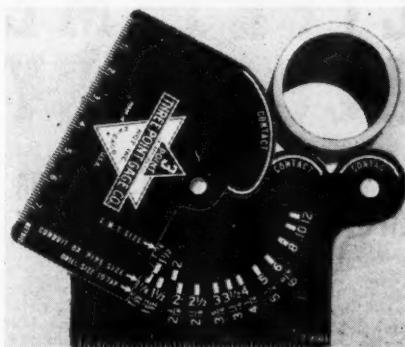
depends upon the size and condition of the reamer. The reamer, with the setting of the expansion plug undisturbed, is then placed between centers on a universal tool and cutter grinder, the Red-E Special Center being used to support the expansion plug end. Being a floating type center, it permits centering the front pilot surface with an indicator. The reamer is now set up so that the flutes may be ground concentric with the plug.

Three-Point Pipe Gage

A non-breakable lightweight gage for use in measuring all sizes of pipe from $\frac{1}{8}$ to 12 inches in diameter, as well as all sizes of electrical conduit and electrical metallic tubing, is announced by the Three-Point Gage Co., 3767 N. Racine Ave., Chicago 31, Ill. Supplied complete with a leatherette case, the gage has an overall size of $2\frac{3}{4} \times 4\frac{1}{2}$ inches when closed, thus enabling it to be readily carried in a shirt pocket.

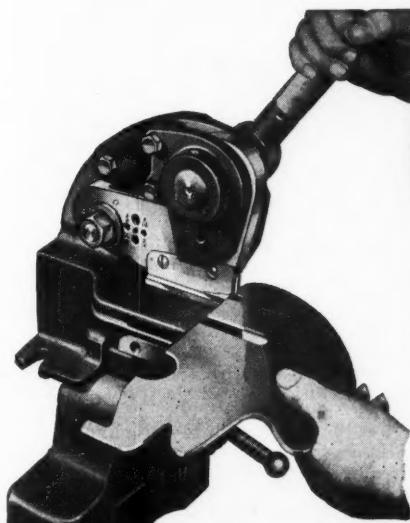
To use, the fixed double contacts on the lower plate of the gage are placed against the outer contour of the pipe to be measured and the movable section of the gage

then turned until the single contact of same touches the pipe. In measuring electrical metallic tubing, the E. M. T.



Three-Point Pipe Gage

size scale is read. In measuring electrical conduit and pipe, the conduit or pipe size scale is read. A third scale provided shows the correct drill size for tapping.



* MINUTE-MISER OF THE MACHINE SHOP

THE HEINRICH HEAVY DUTY HAND NIB

A tool for shearing, nibbling and rod cutting. Cuts irregular sheet metal shapes quicker and better. Capacity, $3/16$ " flat stock— $3/16$ ", $1/4$ ", $5/16$ " and $3/8$ " round stock.

An ideal machine for Toolrooms, Machine Shops—also for Pattern or Experimental Work.

Prompt Delivery
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THE NATIONAL MACHINE TOOL CO.
1536 CLARK STREET RACINE, WISCONSIN

Your Buying LIFETIME ACCURACY

...WHEN YOU PURCHASE FONDA
LIFETIME-CARBIDE GAGE BLOCKS

BY TEST: Accelerated wear-resistance tests show the average wear of gage blocks of three types to be: Lifetime-Carbide, —11 Millions; an Alloy-of-Steel, —133 Millions; Steel, —1530 Millions. These recent tests, using a common shop abrasive, show conclusively that Lifetime-Carbide has a life as much as 139 to 1 over other types of gage blocks.

| | |
|-------------------------|--|
| STEEL | Lifetime-Carbide Costs Less In Use Than Any Other Gage Block Made |
| ALLOY-OF-STEEL | |
| LIFETIME-CARBIDE | |

NOTE: Further proof of the universal acceptance of carbide as the most wear-resistant gage-block material is the recommendation, by other gage block manufacturers, of the use of carbide wear blocks to prolong the life of their steel and alloy-of-steel gage blocks.

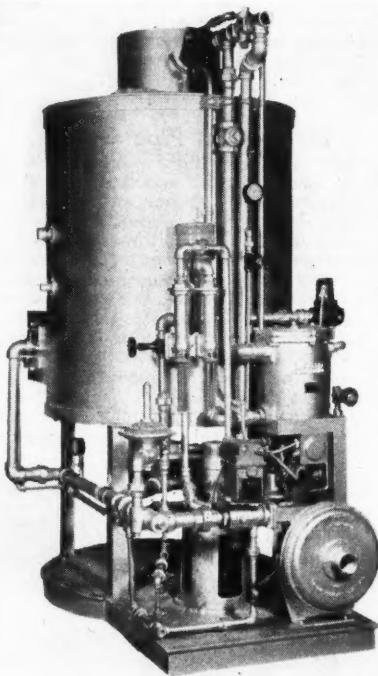
BY SHOP EXPERIENCE: A Fonda customer used a 35-C set of Lifetime-Carbide blocks in the grinding room of their plant, subjecting them to extreme punishment on two shifts daily. In six months the set had received a normal 10 to 15 years' usage. Inspected at the end of this time, the calibration certificate attested that not one worn gage block could be found. No wear observed—not one millionth! Heretofore, they had found their inspection sets to wear from 10 to 25 millions in three months' time, though handled with meticulous care in a temperature-controlled laboratory.

Write for complete details.



"Hyen" Hydryzing Generator

A recent development in endothermic atmosphere generators is the "Hyen" Hydryzing Generator, a fully automatic central stage unit that can be used to furnish atmospheres for a number of



"Hyen" Hydryzing Generator

furnaces. Manufactured by the Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Ill., the unit is said to produce a clean, dry gas for hardening, brazing, and sintering all medium and high carbon steels without decarburization or carburization.

The Hyen is fully automatic and can be installed in an out-of-the-way location. After lighting the pilot, all phases of the operation are controlled by means of push buttons. A refractory retort permits the use of unusually high cracking temperatures, thereby enabling the unit to produce a very clean and dry gas.

Designed for operation by means of city gas, natural, propane, or butane for

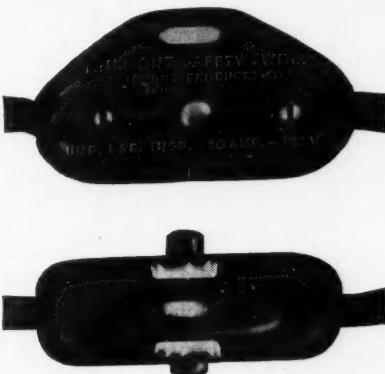
both atmospheres and heating, the Hyen Hydrizing Generator is made in four standard sizes of 500, 750, 1,500, and 2,500 c.f.h., each of which is compactly constructed so as to require a minimum floor area.

Trilmont Safety Switch

A double-pole single-throw push-through cord safety switch which is designed to operate satisfactorily on electrical devices rated up to 2,500 watts a.c. or d.c., 125 or 250 volts, and carries the Underwriters' Laboratory listing of 20 amperes at 125 volts is now being marketed by the Trilmont Products Co., Walnut St., at 24th, Philadelphia 3, Pennsylvania.

The switch mechanism consists of an easy-to-push, fast snap action, over-the-center, spring-controlled tapered shaft, operated by red and black plastic push buttons. The tapered shaft passes through a plastic shorting bar on which are mounted two silvered plates. The shorting bar moves the two silvered plates into an on-or-off position, thus making or breaking the power supply at four fixed silvered contacts. Each of

the four fixed silvered contacts has a terminal screw for wire connections



Trilmont Safety Switch

thereto. When the red button is pushed to the "on" position, the current of the power supply is connected to the electric

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MAINTENANCE
AND REPAIR

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WITH *Easy to Operate*

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ARC WELDERS

A RANGE OF MODELS FOR EVERY WELDING JOB!

"Job Tested" Trindl Welders, outstanding in the welding field because of the Simplified Operation and Ruggedness of Design and Construction, are unbeatable for practical efficient low cost operation. Trindl Welders, preferred for general industrial, farm and automotive production, construction, maintenance and repair, are available in a range of models for every type of shop or welding job.

Dependable Trindl Welders, Welding Supplies and Accessories are available to save you both—time and money...

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Trindl PRODUCTS LTD.
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appliance cable. When the black button is pushed to the "off" position, it completely disconnects the power from the appliance.

The switch mechanism is enclosed in a rugged plastic housing in which space is provided for strain relief washers. Additional space is provided inside the housing for a neon lamp and a power resistor. These two items are connected only in the "on" position, when the lamp is lighted, by the current passing through the switch. Three elongated openings in the top of the plastic housing make the neon light visible from most positions.



GRAY TURRET HEAD METAL CUTTER OR NIBBLER

GRAY, Originator of
First Practical Metal
Cutter or Nibbler

Most modern Nibbler for
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GRAY MACHINE CO.
Box 596, Philadelphia, Pa.

Goodwin Quick-Acting Collet Chuck

A simplified and quick-acting collect chuck for speeding up operations on lathes, tapping, milling, and other ma-



Using Goodwin Quick-Acting Collet Chuck

SALVAGE ABRASIVES **Sand Re-nu**

speedily removes clogging or loading of metal-aluminum and other alloys — embedded in the abrasive grains, leaving a new, clean, cutting surface. SAND RE-NU for woodwork is also available.



SAND RE-NU No. 9 (for metalwork) in 5 gal. cans at \$2.90 per gal. F.O.B. Minneapolis. Order a can today.

Non-Toxic • Non-Combustible • Economical

MASSIE MANUFACTURING CO.

P. O. Box 28-M, Lake St. Station,
MINNEAPOLIS 8 • MINN.

chine tools is announced by the Goodwin Manufacturing Co., 1743 Second Ave., Cuyahoga Falls, Ohio. The chuck is solidly constructed and, through the cantilever action of hardened steel fingers, provides a positive, powerful grip.

The Goodwin Quick-Acting Collet Chuck is controlled by a short lever re-

OILY FLOOR TROUBLES stopped with FULLERS EARTH!



An oil and grease absorbent that re-
places sawdust or wood shavings. Less-
ens fire hazard. Stops accidents due
to slipping on oil or grease! Low
priced—economical—safe! Write
for FREE SAMPLE or ask for trial
order at quantity price!

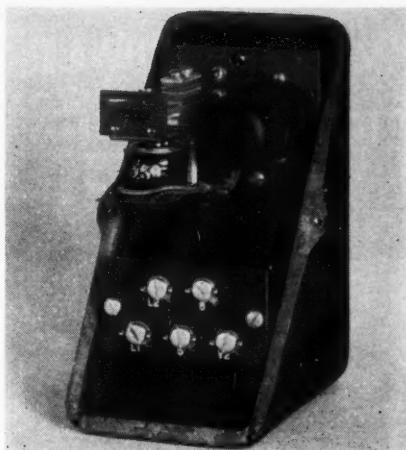
TAMMS SILICA CO.
228 N. LaSalle St., Chicago 1

quiring only finger-tip force to open or close the collet. The threaded nose cap can be readily removed for changing collets or turned to adjust collet gripping pressure and locked by proper adjustment by a key which engages a spring with engraved slots on the inner surface of the adjusting collar. The chuck adapter plate is threaded to fit the machine spindle but can also be supplied with a straight or tapered hole to fit motor shafts, and so on.

ATC P7 Electronic Relay

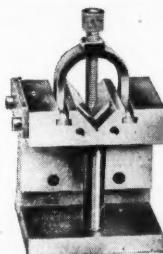
Designated as the ATC P7, a super-sensitive electronic relay, actuated by dimensional changes down to micro-inches from "feelers" carrying as little as 2 micro-amperes current, is now being manufactured by the Automatic Control Co., Inc., 34 E. Logan St., Philadelphia 44, Pa. The device is claimed to be particularly useful in the precision gaging of mass produced parts.

The snap-acting SPDT control contacts are designed to carry 12 amperes at 110 volts, a.c. and can be used for starting or stopping a machine motor or providing



ATC P7 Electronic Relay

an alarm when dimensional tolerances are exceeded. The accompanying illustration shows the P7 relay mounted in one-half of a dust-tight and weatherproof metal enclosure.



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LASSY PRECISION V-BLOCK ANGLE IRON**

**Holds work accurately and firmly
for BORING • GRINDING • INSPECTION**

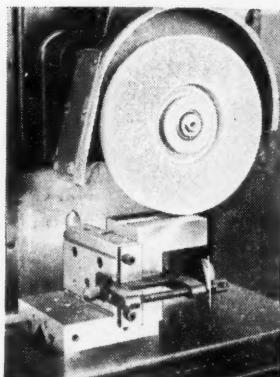
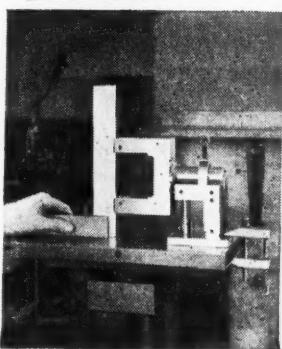
Made of finest steel and artificially aged for stability with surface hardened evenly. All surfaces are ground parallel and square within .0002. This angle iron replaces many special jigs and fixtures and pays for itself in time saved in setting up jobs.

Right: Grinding a fixture square both ways. Diamond is adjustable on angle iron so wheel can be dressed without raising or lowering spindle.

Left: Checking squareness of tool in relation to shank. Base plate of angle iron permits clamping it to surface plate.

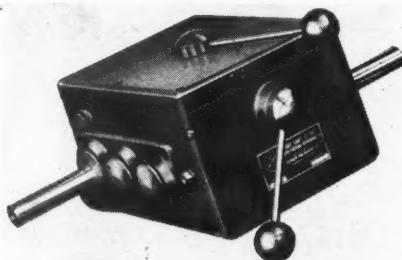
Send for Folder M-30.

LASSY TOOL COMPANY
Plainville, Conn.



Turner Six and Nine-Speed Uni-Drives

The addition of a six and nine-speed selective sliding gear transmission to its line of Uni-Drive three and four-speed



Turner Nine-Speed Uni-Drive

transmissions is announced by the Turner Machinery Co., 3416 Terrace, Kansas City, Mo. The units feature precision-cut heat-treated gears mounted on nickel steel shafts and operating in oil baths. The streamline case of each unit is of lightweight cast aluminum.

Designed for power units from $\frac{1}{2}$ to 20 h.p., the Turner Six and Nine-Speed Uni-Drives can be used on lathes, turret lathes, milling machines, shapers, boring mills, hand screw machines and other motorized machine equipment. Standard mounting brackets facilitate installation on a variety of machine tools and other industrial equipment.

Federal Perpendicular Type Uni- versal Testmaster Indicator

Constructed with the dial perpendicular to the axis of the body of the instrument, a perpendicular type universal dial indicator has been added to its Testmaster line by the Federal Products Corp., Providence, R. I. The perpendicular location of the dial is said to make the instrument very useful for general machine shop, toolroom, and inspection jobs.

According to the manufacturer, the Federal Perpendicular Type Testmaster Indicator is especially adaptable for jig borers and also for certain drill press and milling machine applications where the perpendicular position of the dial great-

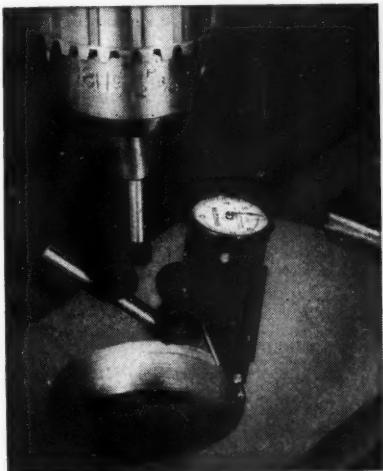
DRILL JIG BUSHINGS

Accurate Interchangeable Concentric

212 N. LAFLIN STREET.

CHICAGO 7, ILLINOIS

ly improves readability. Dovetails, friction clamps, and rods provide for the setting of the indicator to check a wide range of hole sizes, with the dial in a horizontal position. The instrument is available in Models 5 and 6 (English)



Federal Perpendicular Type Universal Testmaster Indicator

graduated to 0.001 and 0.0001 inch respectively, and Models 7 and 8 (metric) graduated in 0.0025 and 0.01 mm, respectively. The indicator features a simple direct combination of lever and crown gear adjustment and jeweled bearings and is available in a plastic case, complete with dovetail clamp and tool post holding bar.

Hardinge Sharpening and Checking Fixture

Designed to provide a convenient and accurate means for rapidly sharpening and checking the sharpening of circular form tools for automatic screw machines and turret lathes, the sharpening and checking fixture now being placed on the market by Hardinge Brothers, Inc., Elmira, N. Y., can be readily applied to the table of any standard tool grinder. Circular form tools for either right or left-hand cutting, having plain, octagon, serrated, ratchet, or pin-type hubs, can be sharpened on the fixture and the sharpening checked without removing

"RAWHIDE PROTECTS" CHICAGO RAWHIDE PROTECTS MOST



Chicago Rawhide
hammer faces of
coiled rawhide may
be quickly replaced
in the permanent
malleable iron heads.



For "soft" mallets and hammers, no other material has the *natural* protective qualities of tough, coiled rawhide. It protects finished surfaces, valuable machines and expensive dies...delivers maximum striking power and durability at the same time.

Fifty-eight years of experience in selecting, processing and seasoning mechanical rawhide is behind every Chicago Rawhide mallet and hammer. This is your assurance of a *rawhide* hammer or mallet that will stand up under severe, continuous blows—and still furnish maximum protection. Always specify *Chicago Rawhide*.

CHICAGO Rawhide MFG. CO.

1207 ELSTON AVE. • CHICAGO 22, ILLINOIS

Hardinge Sharpening and
Checking Fixture



tools from the fixture or tool grinder.

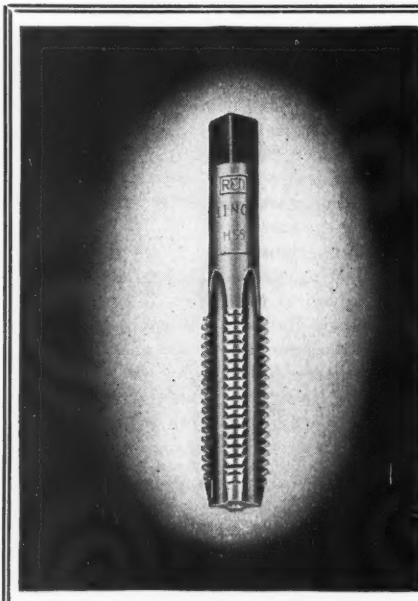
In use, the Hardinge Sharpening and Checking Fixture is first installed on the tool grinder table and the dull circular form tool then placed in the fixture and the cutting edge positioned with the sliding gage bar for sharpening. The setting of the sliding gage bar is governed by the direct reading graduation on the top of the fixture. The tool is sharpened by using a cup style grinding wheel. Without removing the tool from the fixture, the sliding gage bar is set to the "amount below center" for the particu-

lar tool and the sharpening operation is checked.

The Hardinge Sharpening and Checking Fixture can be used in sharpening circular form tools up to $3\frac{1}{2}$ inches in diameter and $2\frac{1}{4}$ inches long having center holes as small as $9\frac{1}{4}$ inches and as large as 1 inch. The maximum distance below center for the cutting edge of the tool is $\frac{1}{8}$ inch. The fixture is $3\frac{1}{8}$ inches long x $3\frac{3}{4}$ inches high x $3\frac{1}{2}$ inches wide. The width of the removable key is $\frac{1}{16}$ inch.

Kurman Self-Starting Synchronous Motor

A small self-starting synchronous motor which is said to require an input of only $1\frac{1}{2}$ watts and produce a starting



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TAPS**
For Every Purpose

How Reiff & Nestor Company have kept pace with the demands of modern industry to meet their many varied needs is shown by the wide variety of Taps we make specially designed to thread Hard or Soft Steels, Stainless Steel, Cast Iron, Aluminum, Magnesium, Brass, Copper and Plastics.

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LYKENS **PENNSYLVANIA**

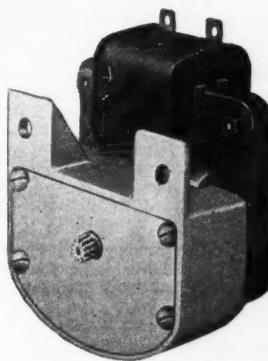
and synchronous running torque of 10-inch-ounces at 1 r.p.m. is now being manufactured by the Kurman Electronics Corp., 35-8 37th St., Long Island City 1, N. Y. Since the gears are enclosed in a die casting which supports the bearings and seals the lubricant, no reoilng is required. The rotor shaft operates in a collar of oil, the lubricant being retained in the bearing by capillary attraction.

The standard motor illustrated is designed to operate on 110-125 volts, 60 cycles and has a load shaft speed of 4 r.p.m. The pinion normally provided on the load shaft has 10 teeth of 64 pitch, $\frac{1}{2}$ -inch pitch diameter. Lower speeds can be readily obtained by adding a gear sub-assembly of proper ratio, held between two plates, one of which is screwed to the die casting.

The Kurman Self-Starting Synchronous Motor can be furnished for voltages from 1 to 250 and frequencies from 25 to 120, and the direction of rotation may be either clockwise or counterclockwise. The overall size of the motor is $2 \times 2\frac{3}{8} \times 1\frac{1}{4}$ inches, and the unit weighs approximately 9 ounces.

Among the many applications for which the Kurman Self-Starting Synchronous Motor is said to be ideally suit-

ed are industrial timing devices and controls, such as photographic timers, electric range timers, traffic timers, railway



Kurman Self-Starting Synchronous Motor

signal timers, X-ray timers, stoker and oil burner controls, thermostats, instrument movements, time delay relays, and so on.

BALANCING WAYS

Shops handling rotating parts find this simple, sturdy and thoroughly dependable device highly efficient for balancing and truing operations. It assures better work...saves time...saves labor. No leveling required.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.

| Swing | Greatest Distance Between Standards | Capacity in lbs. |
|--------|-------------------------------------|------------------|
| 20 in. | 20 in. | 1,000 |
| 40 in. | 30 in. | 2,000 |
| 60 in. | 30 in. | 2,000 |
| 72 in. | 66 in. | 5,000 |
| 96 in. | 88 in. | 10,000 |



Write for
BULLETIN 10-22

ANDERSON BROS. MFG. CO.

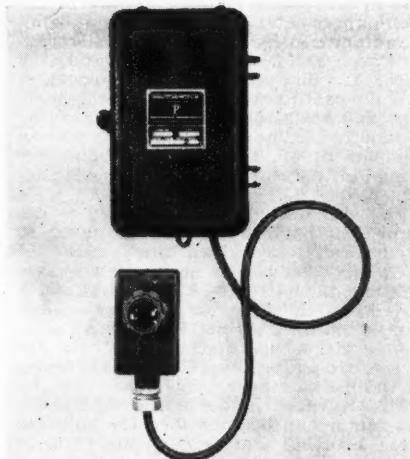
Anderson

ROCKFORD, ILL. U.S.A.



Photoswitch General Purpose Industrial Photoelectric Control

A photoelectric control designed for general industrial and machinery application is now being marketed by Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass. The control is particularly recommended for such applications as counting, conveyor control, short-range signal system, motor or valve control, production inspection, machinery safeguards, stop-motion control in the textile, paper and wire industries, as well



Photoswitch General Purpose Industrial Photoelectric Control

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. inexpensive — Last for years. Write for Circular.

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DIE COMPANY**
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Speediest Way to LOCATE CENTERS for Precision Drilling

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OPTICAL CENTER LOCATOR

Ingenious Center-Locator saves time and makes your drill press do the work of a jig boring machine. Now you can drill and space holes to within .001" . . . drill round holes in thin material . . . avoid drill run-outs . . . counter bore holes with ordinary drill. Simply lay out work with height gauge, locate center through the powerful magnifier—then replace it with any of the 16 drill bushings furnished. Ask your mill supply house, or order direct.

Literature on Request.

MASTER SPECIALTY COMPANY
3010 E. Lake St. • Minneapolis 6, Minn.

as automatic control for hundreds of specialized industrial processes.

Available in two series designated as the 20 and 21, the control features a phototube which must be located at the point where operations are being observed and is available either integral with the housing or in a small separate housing. The latter arrangement permits the use of the control where space is limited. A tamper-proof sensitivity adjustment is provided on the control housing to permit positive operation over varying distances between phototube and light source. Simplicity of installation is afforded by having a single set of terminal board connections in the control to provide the supply current for the light source. The light source requires

THE MEEKER TIMKEN ROLLER BEARING LIVE CENTER



The original live center with replaceable point
and Timken Tapered Roller Bearings.
Write for circular

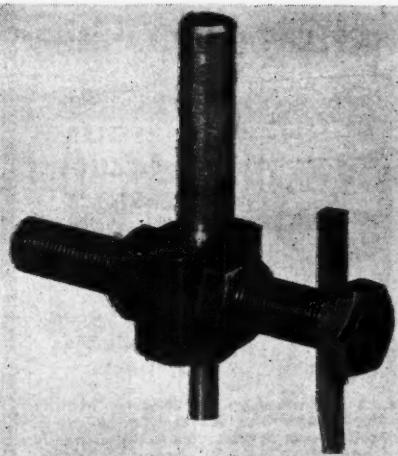
MEEKER MANUFACTURING CO.
892-894 E. 149th St. Cleveland 10, Ohio

only low voltage wiring to this terminal board.

The Photoswitch Photoelectric Control is said to be impervious to moisture and is designed to provide for long life under conditions of extremely high temperature and humidity. Hermetically-sealed, oil-filled condensers and high wattage resistors are used throughout.

Electro-Mechano Adjustable Circle Cutter

Said to be completely adjustable to 0.001 inch, an adjustable circle cutter for quickly and efficiently cutting holes, discs, shoulders, circular patterns, and designs in metal, plastics, and other materials has been placed on the market by The Electro-Mechano Co., 261 E. Erie St., Milwaukee 2, Wis. Features of the unit include a threaded tool arm which is said to allow for circle diameter adjustments to within 0.001 inch; positive bar lock consisting of two large, sturdy lock nuts for maintaining the tool arm setting; rigid tool lock for holding tool bit firmly in place and minimizing chatter; keyed tool arm for maximum accuracy and



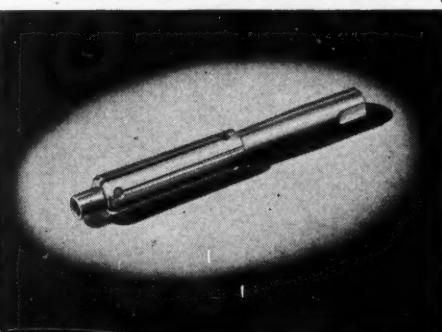
Electro-Mechano Adjustable Circle Cutter

rigidity; and removable pilot for cutting discs. A $\frac{1}{4}$ -inch pilot is supplied as standard for the tool, however, other sizes

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• Just a dozen Champion Expanding Mandrels will do the work of hundreds of solid mandrels and cost you only about one-fifth as much! Champions completely and accurately fill holes in the $\frac{1}{2}$ " to $6\frac{1}{2}$ " range, with infinite variations . . . hold work of any length bore; maintain close tolerances; and release work easily. • Made in two simple parts — a flexible round sleeve and a taper arbor—of top-quality, heat-treated steel, Champions efficiently handle all hard and soft metals, on all large and small jobs. You can depend on Champions.

Expanding Mandrels



The WESTERN Tool and Manufacturing Co., Inc.
SPRINGFIELD, OHIO

Stocked by Leading Industrial Supply Distributors from Coast to Coast

ARTUS PLASTIC SHIM



AND
FEELER
GAUGE
STOCK

The COLOR
tells the
THICKNESS

Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together. \$3.75.

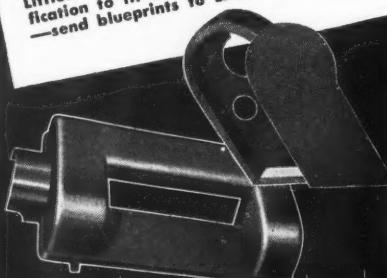
Order today. Immediate delivery.

INDUSTRIAL PRODUCTS SUPPLIERS

106 Water St., Dept. M, New York 5, N. Y.

GEAR GUARDS

Protect your men from serious accidents, and cut the loss of valuable work hours—cover gears, chains, belts, wheels, with a Littleford fabricated guard. Made to specification to fit any machine large or small—send blueprints to Littleford.



LITTLEFORD

LITTLEFORD BROS., INC.
433 E. Pearl St., Cincinnati 2, O.

are available on order.

The Electro-Mechano Adjustable Circle Cutter can be obtained with a No. 2 tapered shank as well as a $\frac{1}{2}$ -inch straight shank. Quickly and accurately adjustable, the cutter is claimed to be ideal for job-lot shops, production plants, and home workshops.

StaSafe Eye Mask

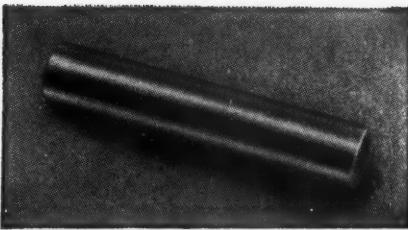
By means of a process in which plastic lenses are individually injection molded, the StaSafe Eye Mask now being manu-



StaSafe Eye Mask

factured by the Standard Safety Equipment Co., 232 W. Ontario St., Chicago 10, Ill., is said to offer all of the toughness of pliable plastic in an optically perfect lens. Wide vision lenses are molded to a correct 6.00 curve for natural vision sight without obstruction, reflection, or distortion, and are made purposely roomy enough to be worn over corrective glasses when necessary. Lens replacement can be effected quickly and simply.

Non-flammable and extremely light in weight, the StaSafe Eye Mask, which weighs $1\frac{3}{4}$ oz., is attractively designed to a precision curve that is said to com-



DANLY PRECISION DOWEL PINS

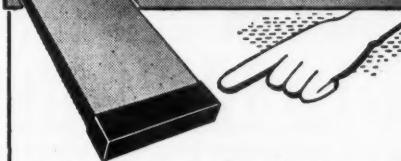
STANDARD AND .001 OVERSIZE

Hardened and Precision ground to a tolerance of $\pm .0001$ of an inch. Available in .001 oversize for repair or renewal work.

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Here's Why FORTHMAN SCRAPERS
provide FINER FINISHES FASTER!



Forthman Scrapers are tipped with super-hard CARBOLOY CEMENTED CARBIDE to resist wear and hold keen cutting edge over longer periods of continuous use! In terms of user benefits, this means

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NUMBERALL

WITH THE COST OF STAMPING NUMBERS

Multi-Wheel Numbering Machine Model 70



The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20.

Model No. 70

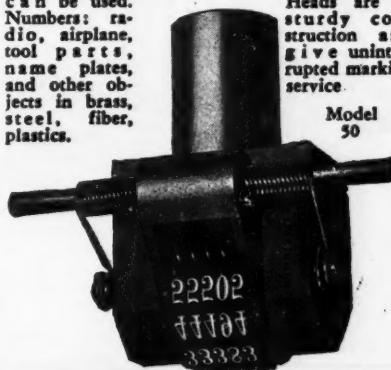
*Write for
Bulletin MS-70.*

AUTOMATIC INDENTING NUMBERING

HEAD • MODEL 50

Automatic indenting numbering head for consecutive or repeat numbering. $1\frac{1}{32}$ " up to $\frac{3}{8}$ " high figures can be furnished in sharp face Gothic or shaded Roman figures. Prefix or suffix letter wheels. Bench, foot, or power presses can be used. Numbers: radio, airplane, tool parts, name plates, and other objects in brass, steel, fiber, plastics.

Model
50



NUMBERALL STAMP & TOOL CO.

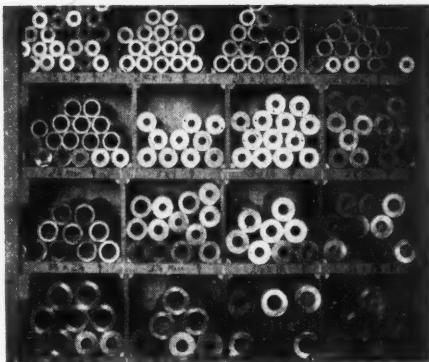
HUGUENOT PARK STATEN ISLAND 12 N.Y.

fortably fit all average facial contours. The all-plastic construction provides for cleanliness and sanitation. A pliable plastic head band and adjustable buckle assure proper fit to any required head size, while special air vents on both sides of the mask provide constant cross ventilation as a precaution against fogging. The eye mask is available with either clear or eye-resting green-tinted lenses.

Torrance Standard Bronze

A tough, centrifugally cast aluminum bronze bushing stock designated as Torrance Standard Bronze is announced by the Torrance Brass Foundry, 1825 W. 213 St., Torrance, Calif. The stock is available in sizes ranging from 1½ to 6¼ inches outside diameter with practical inside diameters.

According to the manufacturer, centrifugal casting ensures maximum density, uniform grain structure, and total absence of inclusions. In addition, the Torrance process reduces clean-up to a minimum since the castings are said to be concentric and have no draft. Aluminum bronze is claimed to offer high resistance to corrosion and abrasion, unusual physi-



Torrance Standard Bronze

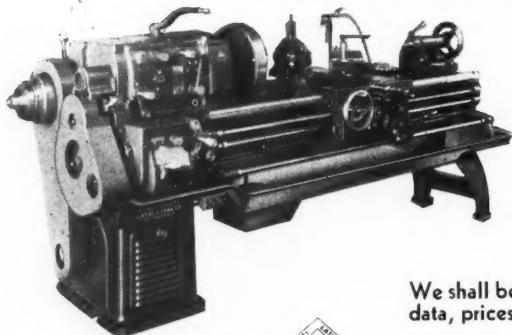
cal properties, low coefficient of friction, and to be extremely light in weight.

Samson Skid Lift Truck

Designed to provide an efficient and economical means of elevating a loaded skid to machine or bench height, a skid

O F OUTSTANDING VALUE...

Cincinnati Quick Change, Geared Head, Motor Driven Lathes are offered with swings in 14", 16", 18", 20", 22" and 24", and center distance from 30".



Simple in design, easy to operate, with 12 spindle speeds, and 32 thread and feed changes, they are real profit-making tools for repair, maintenance and general manufacturing machine shops.

Incorporating the best of materials, including hardened drive gears, forged alloy steel spindle, and Timken bearings, etc., the workmanship is to the highest standard.

We shall be glad to furnish you complete data, prices and deliveries.

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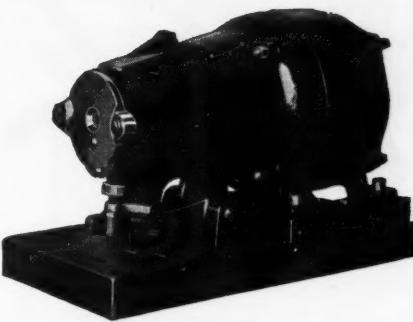
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Put a Perfection Wire Stripper into operation and start realizing a substantial saving in time and labor instantly. Using this rugged precision-built machine, your most unskilled operators can remove insulation from the ends of solid, stranded or multi-conductor wire in a twinkling. Hundreds of plants all over the country are using the Perfection Wire Stripper with marked success. Why not you? Ask at your tool source or send today for complete details.

DISTRIBUTORS. Some territories are still open, offering substantial profit possibilities. Write regarding yours.



PERFECTION WIRE STRIPPER

WEBER MACHINE CORP.

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CARBIDE TOOL GRINDERS

A MODEL FOR EVERY NEED

EITHER WET OR DRY OPERATION

HEAVY DUTY CHIP BREAKER

Handles all size tools . . . accommodates all angles . . . heavy duty, smooth, accurate, vibrationless operation . . . easy to read Any Angle Vise is standard equipment.



VISIT BOOTH A-138, NATIONAL METAL CONGRESS

HAMMOND MACHINERY BUILDERS, Inc., 1615 Douglas Ave., Kalamazoo 54, Mich.

10" WET GRINDER

No Splash, No Spray
A complete line of wet or dry Carbide Grinders for 6" to 14" wheels. Cut grinding costs by using Hammond 10" or 14" machines.



WRITE
FOR
BULLETIN

Samson Skid Lift Truck



lift truck for machinists, die-makers, novelty manufacturers, printers, screw manufacturers, metal products manufacturers, and so on, has been added to its line of Samson equipment by the General Sales & Engineering Co., 20 E. Jackson Blvd., Chicago 4, Illinois.

Constructed of welded steel combined with accurately machined semi-steel

castings, the truck includes a worm and worm wheel that operate in oil on ball bearings and are said to be non-reversible under full load. The unit features a capacity of 1,500 lb. and is equipped with a skid-holding platform measuring 24 x 60% inches. The truck, which occupies a floor space of 34 x 66 inches, has an overall height of 42 inches and a maximum skid elevation of 33 inches. The extreme lowered height of the unit is approximately 7 inches, and the elevation is $\frac{1}{2}$ inch per crank revolution.

Dayton Rogers Model "L" Pneumatic Die Cushion

Designated as the Model "L," an improved pneumatic die cushion which may be mounted directly to the bottom of the bolster plate of a punch press

GRAHAM MULTI-PURPOSE VISE

6", 9" and
12" JAWS



This vise becomes a jig or fixture, saving much toolmaking. Has drill guides, stops, special jaws, repeat-operation precision. Sizes up to 124 lbs.



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NEW BULLETIN 41

completely illustrating and pricing the above Vise and Attachments, also our famous

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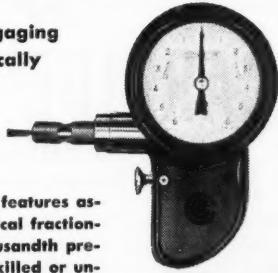
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From $\frac{1}{8}$ " to 8", precision bores gaged to fractions of .0001"

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Automatic features assure identical fractional ten-thousandth precision in skilled or unskilled hands. Not a passing reading. Detects front or back taper, out-of-round, barrel shape, in addition to showing exact size of hole. For machine operators, routine inspection, laboratory checking.

Request Illustrated Price Bulletin 33

THE COMTOR CO.

64 Rumford Ave. Waltham 54, Mass.

MANY USES— BIG SAVINGS WITH **CERRO** LOW TEMPERATURE MELTING **ALLOYS**

CERROMATRIX—250° F. For securing punch and die parts; anchoring machine parts; short run forming dies, etc.

CERROBEND—158° F. As a filler for bending thin-walled tubing—melts out in boiling water. Also used for automotive and aircraft assembly jigs, forming dies, etc.

CERROSAFE—165° F.-190°F. Used for proof-casting cavities in molds, forging dies, duplicate patterns, etc.

CERROBASE—255° F. Used in electroforming dies, molds, etc.

CERROTRO—281° F. Metal molds for wax patterns used to make precision castings. **CERROLLOW**—117° F., **CERROLLOW**—136° F. and **CERROLLOW**—174° F.

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Brooklyn 7, N. Y.—Belmont Smelting & Refining Works, 330 Belmont Ave.
Chicago 6, Ill.—Sterling Products Co., Inc., 121 N. Jefferson St.
Cleveland 14, Ohio—Die Supply Co., 5345 St. Clair Ave.
Dallas 1, Texas—Metal Goods Corp., 2500 S. Ervay.
Detroit 17, Mich.—Castaloy Metal Sales Co., 197 S. Waterman Ave.
Houston 1, Texas—Metal Goods Corp., 16 Drennan St.
Kansas City 8, Mo.—Metal Goods Corp., 1701 Baltimore.
Los Angeles 21, Calif.—Composite Die Supply Co., 1855 Industrial St.
Milwaukee 3, Wisc.—Williams-Collins, Inc., 2409 State St., W.
Minneapolis 1, Minn.—Northern Machinery & Supply Co., Lumber Exchange Bldg.
Moline, Ill.—Sterling Products Co., 1524 Third St.
New Orleans, La.—Metal Goods Corp., 413 Canal Bldg.
New York 5, N. Y.—Belmont Smelting & Refining Wks., Cerro-Alloy Div., 37 Wall St.
Philadelphia 2, Pa.—Jackson Associates, 152 N. 15th St.
St. Louis 15, Mo.—Metal Goods Corp., 5239 Brown Ave.
Tulsa 6, Okla.—Metal Goods Corp., 19 E. Cameron.
Toronto 8, Ont.—The Canada Metal Co., 721 Eastern Ave.

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40 WALL ST. NEW YORK 5, N. Y.

Attach this
FLEXIBLE TOOL-SHAFT
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for EASY

- GRINDING
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The STOW Flexible Tool-Shaft, in combination with the proper attachments, will perform all the operations so important to shop mechanics and maintenance men, plus many miscellaneous jobs. It expands the applications of power hand-tools also . . . quickly, easily, and economically.

Every shop should have at least one of these STOW Flexible Tool-Shafts. Its ample length and portability makes it ideal for reaching those out-of-the-way, hard-to-get-at places, and it is simple to connect and disconnect.

Adaptable to portable power units, either electric or gasoline, and to stationary power plants. Write for full details today, or see your mill supplies or hardware dealer!

\$15

Here's Real Value For
(5 Ft. Model)
A Price All Can Afford!

6 FT. MODEL \$16.50

STOW

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ROGERS REAMERS

SINCE 1885

RIGHT
HAND
CUT



Adjustable for wear.

**JOHN M. ROGERS
TOOL CORP.**

Gloucester City, N. J.

by drilling and tapping four holes in same to receive the supporting rods D (Fig. 1) is announced by the Dayton

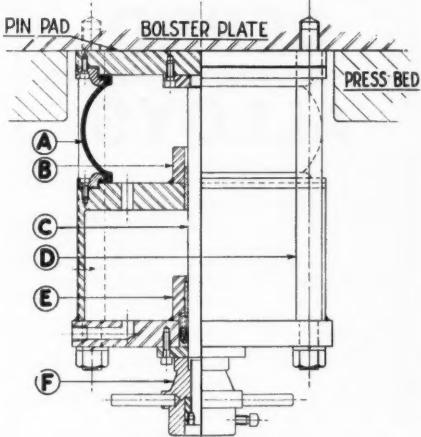


Fig. 1—Drawing showing method of mounting Dayton Rogers Model "L" Pneumatic Die Cushion

Rogers Manufacturing Co., 2F35 12th Ave., S., Minneapolis 7, Minn. The unit can also be provided for press bed mounting through the use of a suitable mounting plate, G. The four suspension rods D (Fig. 2) are mounted on the press bed frame by drilling and tapping.

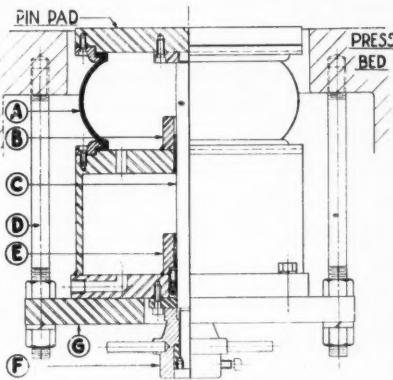


Fig. 2—The four suspension rods D are mounted on the press bed frame by drilling and tapping.



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Manufactured by
**AUTO MOULDING
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Exclusive for over 35 years

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You can always rely on BUTTERFIELD TAPS to give the best possible results at the lowest expense. BUTTERFIELD TAPS can be supplied in four different grades as follows: 1. Carbon Steel Cut-Thread Taps. 2. High-Speed Steel Cut Thread Taps. 3. High-Speed Steel Commercial Ground Thread Taps. 4. High-Speed Steel Precision Ground Thread Taps.

UNION TWIST DRILL CO. BUTTERFIELD DIVISION

Factories: DERBY LINE, VERMONT, U. S. A.
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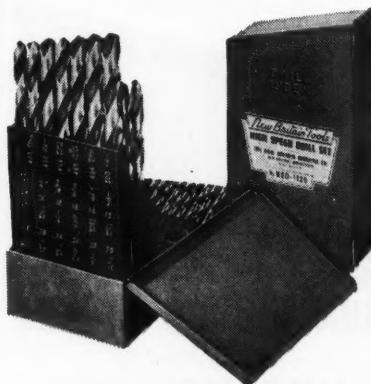


The press bed mounting is designed to allow the operator to remove the bolster plate without disturbing the cushion installation. The unit is provided with a hardened and ground pin pressure pad, the height of which is maintained by an adjustable handwheel, F, thereby making it unnecessary to correct the pressure pad pins for length and also compensating for bolster plate thickness variation and the sharpening and grinding of dies or a change in die design itself.

The Model L Die Cushion includes a bellows type construction which is said to eliminate air pressure loss after the die cushion is charged from the shop air line to the predetermined pressure recorded on the pressure gage furnished. Moreover, the synthetic bellows A is said to protect the cushion unit so that no pierced slugs or other parts, drawing compound, and so on, come in contact with any of the working parts of the cushion. Extra heavy duty large combination stop and guide rods, C, support the pin pressure pad, compensating for off-center loading. The guide rod C is retained in constant alignment at all times by two bushings, B, and E. The Model L is made in sizes from 5 to 14 inches having ring holding pressure from 1 to 8 tons.

New Britain High Speed Drill Sets

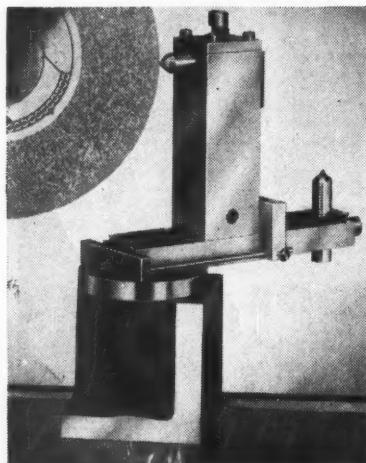
The New Britain Machine Co., New Britain, Conn., announces that it is now offering high speed drills in Huot in-



New Britain High Speed Drill Sets

dexed containers for speeding the selection of the proper size. According to the manufacturer, these alloy steel twist

PRECISION DRESSING AT LOW COST with the "FORM-MASTER"® ANGLE & RADIUS DRESSER



- A sturdy, quality instrument. Designed by form-grinding specialists for accurate dressing of both angles and radii at low cost. Easily set with micrometer for radii—and with protractor or sine-bar for angles. All parts (except base) hardened and ground to close tolerances. Sealed ball-bearings for long-life and accuracy. Two $\frac{1}{3}$ ct. diamonds and case included—\$150.00 complete.

Compare these features:

- Large range
- Chatterless and dustproof
- .0001" accuracy obtainable
- Simple to operate
- Reasonably priced

*Reg.U.S.Pat.Off.

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KNOW ALL THE ANGLES...

on your drills, reamers,
milling cutters, lathe tools, etc.
.. and duplicate them at will!



The precision
optical protractor for measuring
exact angles on cutting tool edges.

- Assures new-tool efficiency on re-grinds.
- Makes duplication of angles easy.
- Checks for centering accuracy on cutting lips.
- Quick inspection of tools without removing from machine or grinder.

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Sent upon inquiry.
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MANUFACTURERS OF OPTI-TOOLS



Every Forsberg Blade bears the famous WHALE BRAND mark of quality. Scientific heat treating and thorough check every step of the way, plus a severe bending pounds test gives Forsberg Blades superior performance. The popular HY-FLEX Blade meets today's demand for extreme flexibility at medium price—it has the guts for solid service.



A Whale of a Blade—MO-HY'S special molybdenum steel gives unusual cutting service—same speed as tungsten with comparable performance. For outstanding results on stubborn jobs, ask your mill supply house for WHALE BRAND HY-FLEX and MO-HY BLADES.

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Blades and Frames • Band
Saws • Coping Saw Frames
and Blades • Screw Drivers
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Forsberg
• MFG. CO., BRIDGEPORT, CONN., U.S.A.

A COMPLETE
LEAD HAMMER
SERVICE...

UNDER
ONE
ROOF!



NEW COOK SHUR-GRIP HAMMER HANDLES — A specially designed drop-forged handle for 3, 4, 5 and 6 lb. COOK LEAD HAMMERS. Gives "bulldog" grip, perfectly balanced. New heads mold firmly, easily over COOK HANDLES!



COOK PRODUCTION HAMMER MOLD
MAKES THREE HAMMERS AT ONCE! Pour lead directly from lead pot or ladle. Close lid of mold and it's in action. Easy to operate. Made expressly for COOK HANDLES.



COOK MOLD AND LADLE —
Makes single hammers from 1 to 11 lbs. easily, quickly. Anyone can operate it.

COOK Ready-Made LEAD HAMMERS — In stock from 1 to 11 lbs.

Ask for complete price list H.

LAWRENCE H. COOK, INC.

Successors to the Johnson-Tool Company

PLASTIC MOLDS AND TOOLS

65 Massachusetts Ave., East Providence, 14, Rhode Island

drills are uniformly hardened and accurately ground, resist heat strain, and can be used in drilling hard or soft steel with equal ease.

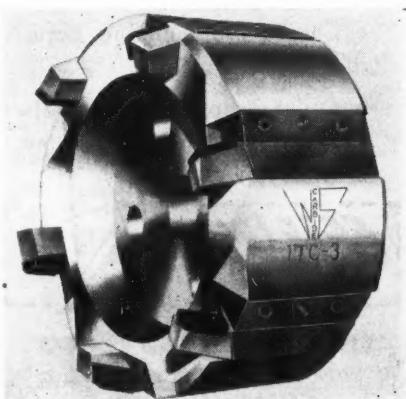
The Huot container includes hinged panels into which the drills are fitted in indexed slots. When the container is open, the hinged panels along with the tools stand in a vertical position and, when the container is closed, the panels and tools lie flat.

The New Britain High Speed Drills are available in four sets: HSD-1113 containing 13 drills from $\frac{1}{16}$ to $\frac{1}{4}$ inch by 64ths; HSD-1121 containing 21 drills up to $\frac{3}{8}$ inch; HSD-1129 containing 29 drills up to $\frac{1}{4}$ -inch; the HSD-1180 containing 60 wire gauge drills from No. 1 through No. 60.

Wendt-Sonis Inserted Tooth Carbide Cutter

An inserted tooth carbide cutter having blades which are interchangeable for any type of milling job is now being introduced by the Wendt-Sonis Co., Hannibal, Mo. The cutter is said to require a minimum of power and is readily adaptable to standard machinery.

The design of the Wendt-Sonis Inserted Tooth Carbide Cutter includes a special type wedge which is claimed to prevent blades from slipping out while in operation. When blades require sharpening, they may be easily removed from the cutter body and ground on an ordinary bench grinder without the aid of special equipment.



Wendt Sonis Inserted Tooth Carbide Cutter

THERE are certain bearing situations where no other type will perform as economically, satisfactorily and efficiently as POBCO SELF-LUBRICATING BEARINGS. Ask for POBCO data sheets and samples.

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O I L E S S B E A R I N G C O., I N C.
W O R C E S T E R 3, M A S S.

WALTON EXTRACTORS

**For Removing
Broken Taps . . .**

Try these handy tools on 30-DAY FREE TRIAL OFFER



When taps break off, it is convenient as well as economical and time-saving to have a set of Walton Tap Extractors at hand. These tools are designed especially to remove broken taps, effectively, easily, and quickly . . . without damage to threads. Write for folder No. 10 and details of free trial offer.

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94 Allyn Street
Hartford 3, Conn.

Fast, Accurate Measurements with

the NEW

***AMIC**

Quick Action

VERNIER CALIPER

Stainless Steel

**THE PERFECT TOOL
for machine shop,
tool room, inspection
control, aircraft-
maintenance, etc.**

A flick of the thumb and you've got your external and internal dimensions. Knife-edged hardened jaws provide exact thread measurements. A depth gage blade gives speedy depth measurements. Made of stainless steel; packed in a sturdy leather case. Scientifically engineered, painstakingly machined and American made, the AMIC Quick Action Caliper is a quality tool without a rival.

| Catalog Number | Size | Graduations | Vernier Reading |
|----------------|------|---------------------|-------------------|
| 21 | 6" | 1/40" | .001 |
| 22 | 6" | 1/40" & full mm. | .001 & .10 mm. |

Also AMIC Precision Vernier Calipers, Height Gages, Depth Gages, Packer Calipers, Comparators, Precision Graduated Metal Scales.

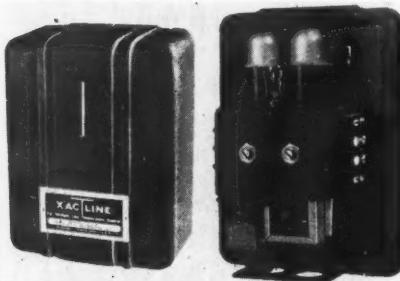
Write for FREE Booklet B and price list or telephone PENNSYLVANIA 6-0687

* Registered Trade Mark.

AMERICAN MEASURING INSTRUMENTS CORP.
240 WEST 40th STREET
NEW YORK 18, N.Y.

"Xactline" Temperature Control Unit

Known as the "Xactline," a temperature control produced by the Claud S. Gordon Co., 3000 S. Wallace St., Chicago



"Xactline" Temperature Control Unit

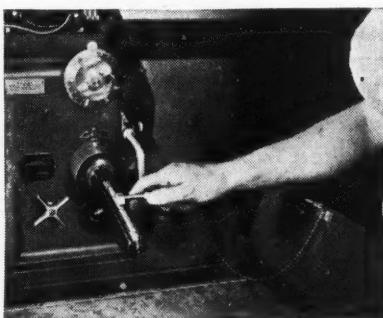
16, Ill., provides for unusually close temperature-variation control; variations as low as 1/5 of a degree F. and power "on-off" cycles as short as 3 seconds are said to have been attained. Factory-

tested for immediate operation, the unit provides "straight line" temperature control without complicated coordination with other equipment, it is stated.

According to the manufacturer, the Xactline Temperature Control Unit is ideal for use in the plastic, molding, tempering, aluminum heat treating, and other heat processing fields. It can be used on all types of electric furnaces, ovens, injection molding machines, and so on, employing conventional millivoltmeter and potentiometer type controlling pyrometers or gas-fired equipment employing solenoid-controlled or motor-operated valves. The control is housed in a cast aluminum case measuring 8 $\frac{1}{4}$ inches high x 6 $\frac{1}{4}$ inches wide x 3 inches deep and designed for surface mounting installation.

Sunnen Diamond Dressing Tool

Especially designed to increase honing speed by keeping stones at top-cutting efficiency, the Sunnen Diamond Dressing Tool shown herewith has been placed on



Sunnen Diamond Dressing Tool

the market by the Sunnen Products Co., 7933 Manchester Ave., St. Louis 17, Mo. According to the manufacturer, the tool quickly breaks the glaze and restores cutting action without wearing the stone out-of-true or fracturing the bond.

The tool is employed by pulling it very lightly over the full length of the stone surface in one stroke. A chain is hooked to a ring fastened to the end of the diamond dressing stick and, by means of this chain and a bracket, the unit can be attached to the honing machine, ready and handy for use when needed.

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OF KALAMAZOO

BACKSTANDS
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into high production
ABRASIVE BELT UNITS

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Hammond Variable Speed
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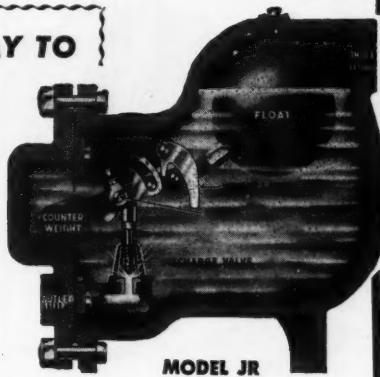
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OFFERING A PRACTICAL WAY TO

**Protect all Air Tools
and CUT "JAM TROUBLE"**

Weight-operated for fast positive action, Nicholson air traps offer plant-proved dependable protection against corrosion and jamming of tools, and blemishing of parts caused by unwanted water and oil in air. Four types. Pressures up to 1500 lbs. Stainless steel working parts. Catalog 444.



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SAVE HANDS WITH STRANDS

**Safeguards
For Punch
Presses**

**Send for Enclosure
and
Sweep Safeguard
Circulars.**



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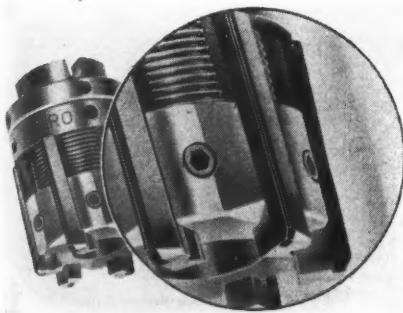
SAFETY ENGINEERS

611 West Lake Street

Chicago 6, Ill.

Metro Heavy Duty Carbide Expanding Reamer

Featuring full-length carbide cutting edges to permit precise reaming operations at high speeds, a heavy duty ex-



Metro Heavy Duty Carbide Expanding Reamer

panding reamer is now being offered in solid shank and shell types by the Metro Tool and Gage Co., 4240 W. Peterson Ave., Chicago 30, Ill. The reamer is also

available with blades of high speed steel.

According to the manufacturer, the Metro Heavy Duty Carbide Expanding Reamer is designed with a low expansion angle to lessen O. D. grinding when resharpening and has a $\frac{1}{8}$ -inch blade overhang to increase rigidity without loss of chip clearance, as well as to provide for extra long reamer blade life. Chrome plated and precision made of high grade heat-treated alloy, the reamer is available in cutting diameters of from 1 to 6 inches. Shell arbors are furnished with straight or Morse taper shanks.

Morey 2-in-1 Hammer

Described as unusually practical for tool and diemakers, set-up work, sheet metal seaming, machine shops, auto repair shops, airplane factories, and so on, the Morey 2-in-1 Hammer now being marketed by Dan Morey, Dept. B101, 814 S. Robertson Blvd., Los Angeles 35, Calif., includes a renewable rubber head and steel head with shank. The rubber head is easily replaceable when worn down by merely pressing a new one on the steel head with the aid of a vise.

Constructed so as to provide for ideal

No Leaks
No Levers
No Packing

Air-O-cheks have the ball and socket joining the enclosed lever to the valve.

Note double grip afforded by long, extra heavy ferrules machined over special shoulder on shank.

Air-O-chek TRADE MARK

AIR GUNS

Comparison quickly demonstrates such Air-O-chek advantages as leak-proof operation, ease of use, dependability and time saving.

That's why four out of five plants adopt Air-O-chek Air Guns as standard after a comprehensive test.

Try it. Install a dozen Air-O-cheks and compare results with the best you ever had.

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Made of Bar Brass and Stainless Steel



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MAKESHIFT
PROTECTION?**

Insure dependable protection to finely machined parts from dust, dirt, moisture, rust, etc., with PRECISION Dust Caps and Thread Protectors. Tough dielectric fibre, spirally wound to fit any shape regular or irregular—forms, coils, etc. Economical—always at hand.

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& Thread
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to cut Keyways when a**

**DAVIS
KEYSEATER**

**will do the
job so much
quicker
and
better?**

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DAVIS KEYSEATER CO.

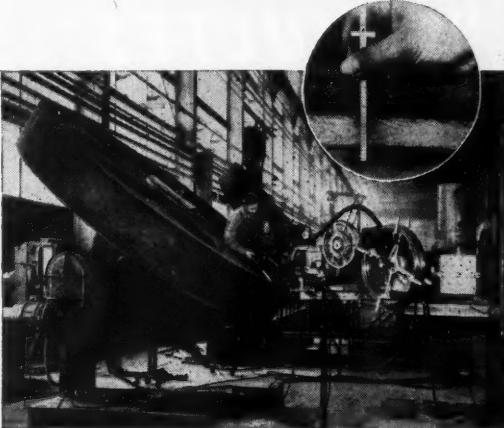
Exchange and Glasgow Sts.
ROCHESTER, N. Y.

THE JOB: To weld the web plates to rim and hub on each side of a 12 foot turbine reduction gear . . . with speed, to meet the weld quality specified by the American Bureau of Shipping and the ASME.

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THE RESULT: Fully automatic welding which produced a clean, high quality fillet 1 1/8 in. across the face (see inset) and 36 ft. in length in one pass. No machining or spatter removal when necessary.

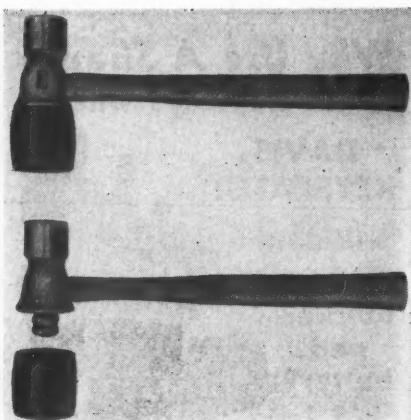


If you need increased production, better downhand welding and lower costs in your welding department, C-F Hand or Power Operated Positioners should be your first choice. Write for Bulletin WP-22 and complete details. Cullen-Friestd Co., 1311 S. Kilbourn Ave., Chicago 23, Ill.



positioned welds
mean better, more
economical welds

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Morey 2-in-1 Hammer

balance, the Morey 2-in-1 Hammer has a hickory handle. The steel shank and head, which measures $1\frac{1}{2}$ inches in diameter, is a drop forging that is heat treated and polished. The rubber head

measures 2 inches in diameter and is carefully compounded of truck tread rubber to provide for the correct degree of toughness based on shop experience and laboratory tests.

Sand-O-Flex Model 350-B Sanding Wheel

The Sand-O-Flex Corp., Dept. 461, 4373 Melrose Ave., Los Angeles 27, Calif., announces a brush-backed sanding wheel to be known as the Sand-O-Flex Model 350-B. Similar to its predecessor, Model 350-A, but smaller in diameter and lighter in weight, the Model 350-B measures $3\frac{1}{8}$ inches in diameter ($5\frac{1}{2}$ inches overall including brushes) and weighs 1 $\frac{1}{2}$ pounds.

The design includes eight replaceable brushes which "cushion" an abrasive strip, thus providing the flexibility necessary for finishing irregular surfaces. According to the manufacturer, the wheel can be effectively used on any electric motor shaft; a 1/6 h.p. motor or a $\frac{1}{4}$ -inch capacity electric hand drill is adequate. The unit is recommended for operation at speeds from 400 to 1,750 r.p.m. and is designed to fit $\frac{1}{2}$ and $\frac{5}{8}$ -inch

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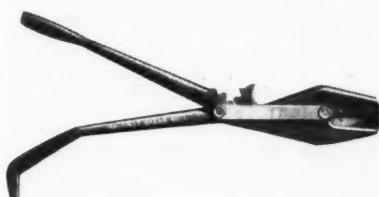
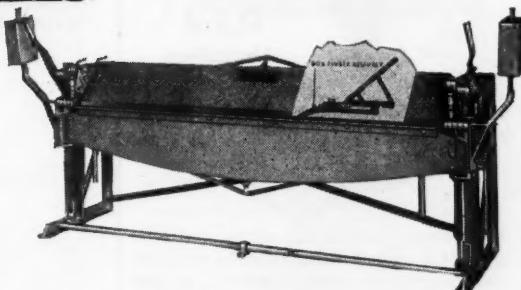
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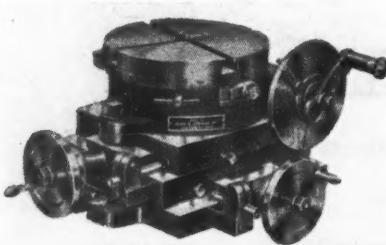
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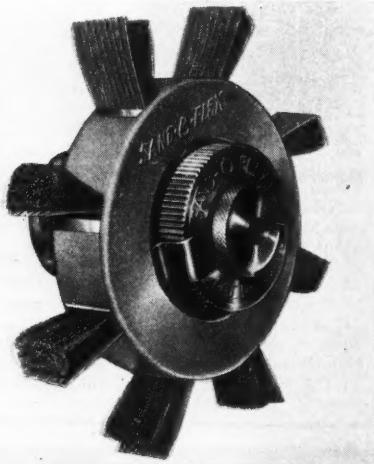
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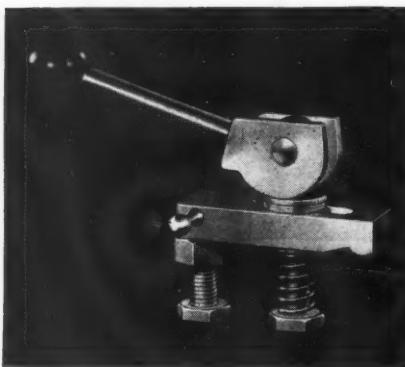
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A fixture clamp for use by toolmakers, designers, and draftsmen in holding



Wespo Fixture Clamp

workpieces, to be known as the Wespo, is now being produced by the West Point Manufacturing Co., Farmington, Mich. The design of the unit includes ground

stud washers with round spherical radii, thus allowing the clamp to float and thereby compensate for irregularities in the work. A plastic ball handle knob which provides for easy and convenient operation is an additional feature.

Made of heat-treated alloy steel and cadmium plated, the Wespo Fixture Clamp is available in five different types for different clamping methods, including quick-action models. Each type is made in six sizes, each of which is adjustable for height.

Severance Solid Tube Deburring Cutter

Severance Tool Industries, Inc., Saginaw, Mich., announces the development of a solid tube deburring cutter which is said to remove stock so cleanly, quickly, and smoothly that holding of work in vises or other fixtures is seldom necessary. Of one-piece construction, the cutter is available in more than 100 different sizes for tubes of various wall thicknesses and diameters up to $2\frac{1}{4}$ inches. It is designed to meet varying deburring requirements such as squaring the tube end to tube center line or re-

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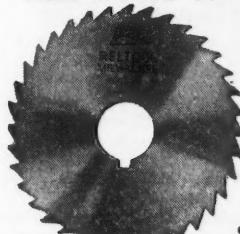
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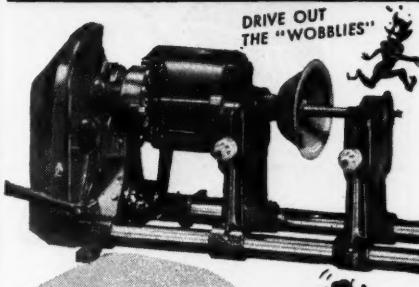
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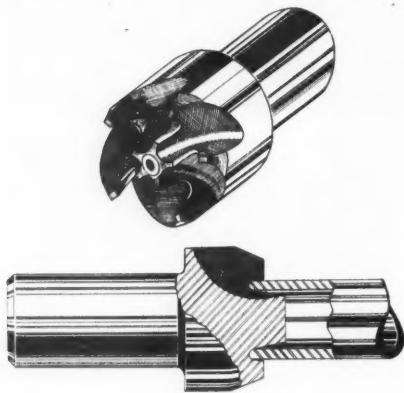
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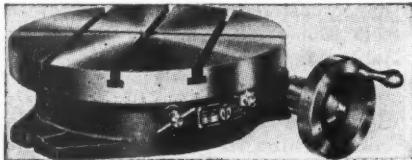
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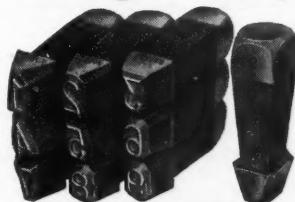
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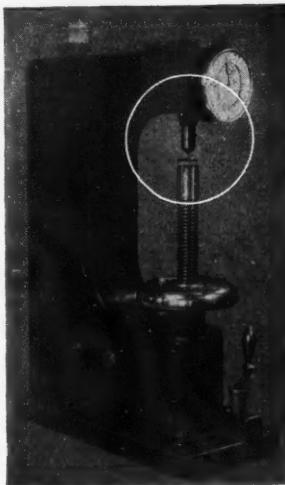
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New Books

Modern Organic Finishes. By Rollin H. Wampler. Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. 445 pages. Illustrated. Cloth binding, board covers. Price, \$10.00.

This book is primarily one of methods. Descriptions of modern finishing materials and equipment for their application, drying, and conveying are presented so that the reader may have an overall picture of modern industrial finishing operations. Throughout, the main emphasis is on proper selection and use of materials and equipment to obtain the best possible finish at minimum cost.

The author's aim is to acquaint the manufacturer with materials and equipment now available and to describe efficient practices and typical procedures for finishing certain articles. In the light of this knowledge, the reader can then clearly solve his finishing problems and select and use the materials and equipment best suited to his needs.

The contents of the book are divided

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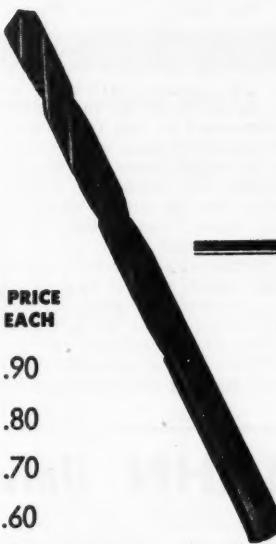
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into six major sections which are headed as follows: Modern Organic Finishing Materials; Modern Application Methods; Drying Methods; Product Handling in the Finishing Department; Finishing Processes; and Some General Considerations. A bibliography and index are included at the rear of the book.

Modern Metalcraft. By John F. Feirer. Published by The Manual Arts Press, Peoria, Ill. 288 pages. Illustrated. Cloth binding, board covers. Price, \$3.50.

The contents of this book are based on the idea that the metal craftsman or student, whether at home or in school, is primarily interested in the following: good ideas for projects, clear-cut procedures on how to build them, directions on how to perform the operations necessary in making the projects, and information on tools, equipment, and metals needed for a craft shop.

The book contains 33 sections, plus an introduction. Each section is divided into two parts; namely, a project idea and a direction sheet. The project idea includes a picture of the finished article, a working drawing, and a complete procedure sheet for making the project. The

direction sheet tells how to perform a step that is a part of making the project. To make the direction sheets more vital, each one is combined with a project in which that particular direction is an important part of the procedure.

The introduction contains general information on equipment, tools, and metals that must be obtained before starting to work in metalcraft.

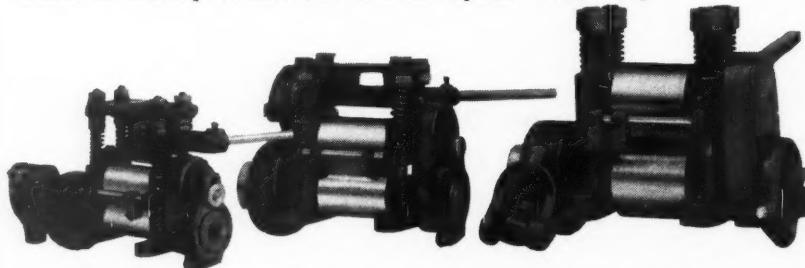
Outstanding features of the book are the more than 150 photographs—besides the ones of finished articles—which show actual steps in making the projects represented, taken while the work was going on and reproduced exactly the same size as the original prints.

Rubber in Engineering. Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. 304 pages. Illustrated. Cloth binding, board covers. Price \$5.50.

Designed to interest a wide variety of readers, this book has as its main purpose that of furnishing engineers with a general survey of the information available on the fundamental properties of rubber. Accordingly, a considerable proportion of the text has been devoted to

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the theoretical aspects of the subject. However, the chapters dealing with these aspects have been so grouped that those readers who are more interested in the practical applications can omit them.

The subject has been treated on the basis of many years of experience of authorities in the rubber and engineering fields, and the problems of those who are interested in both the manufacture of rubber articles and their use are discussed in detail. Theoretical and practical data are presented to demonstrate that certain variables, ignored in other engineering materials, are of fundamental importance in the case of rubber. Because of the fundamental difference between rubber and other engineering materials and because of the difficulty involved in studying the mechanical properties of rubber in relation to practical design, the viewpoints of both engineer and rubber technologist have been compared and combined wherever possible.

Replete with useful graphs, tables, and illustrations, this volume should be of value to chemists and technologists engaged in rubber production or development work, as well as engineers using rubber parts in designing or manufacturing machinery.

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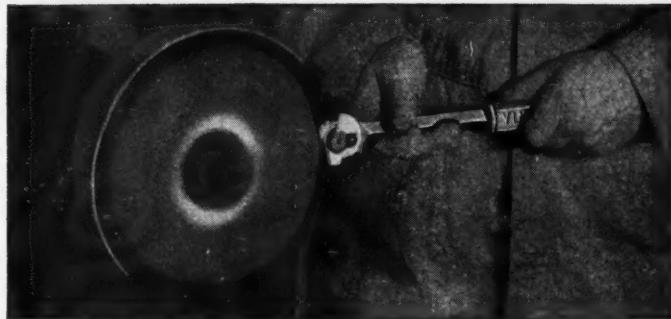
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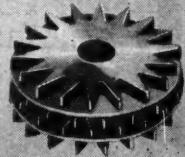
The cleaner—more accurately a grinding wheel is dressed, the less frequently the operation is necessary.

Vincent-Huntington Grinding Wheel Dresser Cutters—made of special steel and heat-treated to an exact hardness by an exclusive Vincent process—wear longer and do not break or mush-over on the toughest hand dressing and truing applications, thus producing a cleaner, more accurate grinding wheel surface. The result—more production per wheel dressing . . . more dressings per dresser cutter.

Complete stocks, in styles and sizes to cover your every hand dressing and truing need, carried at your mill supply house.



Vincent
HUNTINGTON
NEW IMPROVED
GRINDING WHEEL
DRESSERS and CUTTERS



FOR CORRECT DRESSER SIZE USE THIS CHART

- ★ Use #0 Dressers on Wheels up to 1½" Face.
- ★ Use #1 Dressers on Wheels 1½" to 2" Face
- ★ Use #2 Dressers on Wheels over 2¼" Face
- ★ Use #11 or #22 Dressers on Wheels of extra wide Face

**12" LONG
HIGH SPEED 12"
STRAIGHT SHANK
9" FLUTE DRILLS 9" FLUTE**



| Size | Price Each Net |
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| 9/64" x 12" | 1.71 |
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| 11/64" x 12" | 1.71 |
| 3/16" x 12" | 1.71 |
| 13/64" x 12" | 1.82 |
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| 17/64" x 12" | 2.12 |
| 9/32" x 12" | 2.12 |
| 19/64" x 12" | 2.29 |
| 5/16" x 12" | 2.29 |
| 21/64" x 12" | 2.59 |
| 11/32" x 12" | 2.59 |
| 23/64" x 12" | 2.88 |
| 3/8" x 12" | 2.88 |
| 25/64" x 12" | 3.17 |
| 13/32" x 12" | 3.17 |
| 27/64" x 12" | 3.47 |
| 7/16" x 12" | 3.47 |
| 29/64" x 12" | 3.76 |
| 15/32" x 12" | 3.76 |
| 31/64" x 12" | 3.76 |
| 1/2" x 12" | 3.76 |

Send for Free 128-Page Catalogue.

EASTERN TOOL SUPPLY

176 GRAND STREET
NEW YORK CITY 14, N. Y.

New Shop Literature

Starrett Dial Indicators. A completely revised third edition of its dial indicator catalog is announced by The L. S. Starrett Co., Athol, Mass. The catalog contains descriptions and illustrations of the many Starrett Dial Indicators together with information regarding other indicators such as inside and depth dial gages, vibrometers, cylinder gages, and dial gages for measuring the thickness of metal, fiber, cloth, and other materials in sheet form. The catalog also includes complete information on American Gage Design Committee specifications, as well as descriptions and illustrations of the company's line of "Last Word" Dial Indicators. Copy free upon request.

Airco Portable Rail Cropping Machine is described in a six-page illustrated bulletin now being distributed by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. Operating instructions are included, as well as repair and replacement parts lists for the rail cropping machine and the two torches with which it is equipped. Copy free upon request.

SPECIALISTS IN THE MANUFACTURE OF



For Smoother, Quieter Operation
In Applications Where Straight
Bevel Gears Are Conventionally Used

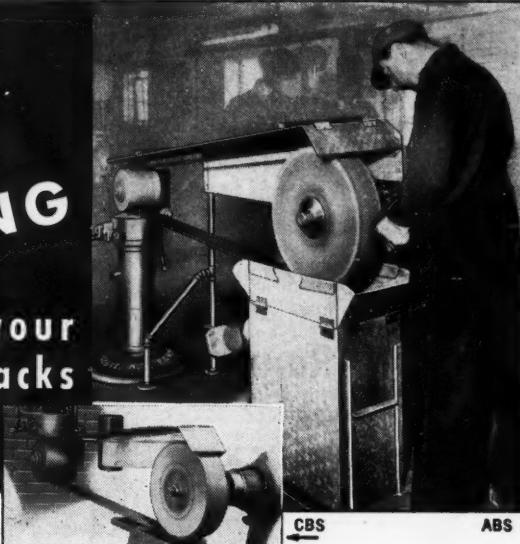
MADE FROM ALL MATERIALS Exactly to YOUR
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DETROIT Bevel Gear COMPANY
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Faster
POLISHING**

Convert your
Old Grinding Jacks

Into



PORTER-CABLE BELT GRINDERS

... With a Wide Range Utility

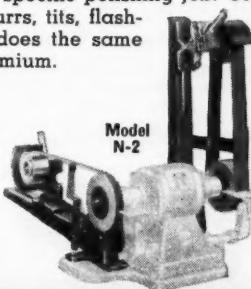
Either of these Porter-Cable Belt Grinders will do an outstanding job on your clean-up or finishing operations. Whichever you choose, you will be sure that it will deliver more work—better work—and at lower cost—than any application of built-up or regular grinding wheels.

The ABS model, employing back-stand idler and composition pulley on jack spindle, can be erected right in a production line to handle a specific polishing job. Or it can be placed in a machining department to knock off burrs, tits, flashings, etc. With wall-mounted idler, the CBS model does the same job but keeps the floor clear where space is at a premium.

Makes Bench Grinders 3 Times More Valuable

Outstanding for burring, the N-2 attachment for bench grinder (opposite) is an all-around job that provides contact grinding on the wheel... flat-grinding on the platen... or contour-grinding on the flexible belt! For the spot where the clean-up jobs are varied, you can't choose a better piece of utility equipment. Quickly adjusted to either vertical or horizontal position.

Write for full information. Bulletin just issued!



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MACHINE CO.

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Belt grinding depicted on film
"MACHINE of the AGE"
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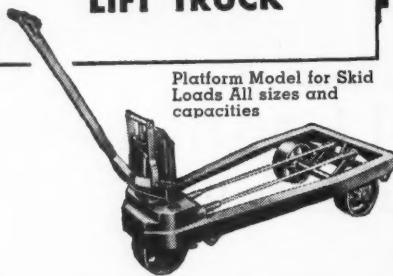
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- or a
- ✓ PALLET LOAD

You can handle it quickly, easily
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LYON-Raymond Hydraulic LIFT TRUCK

Platform Model for Skid
Loads All sizes and
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4000 lb.
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for
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two-faced
pallets

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532 Madison St.

Greene, N. Y.

At the Power Show, N. Y., Dec. 2.

Willey's Carbide Tool Catalog No. 29.
Publication of a 40-page catalog covering its complete line of tungsten carbide tools is announced by the Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit 1, Mich. Among the tools for which illustrated, descriptive, and tabular data is provided are standard tungsten carbide tools and blanks, shell end mills, core drills and reamers, special-tipped tools and milling cutters, ring and plug gages, bushings, tipped gages, centers, sizing, extrusion and wire drawing dies, centerless grinder work support blades, and masonry drills. Carbide tool grinders are also treated in the catalog, copy of which is available free to executives requesting Catalog No. 29.

Cincinnati Bickford Super Service Upright Drills. The Cincinnati Bickford Tool Co., Cincinnati 9, Ohio, is now offering a profusely illustrated booklet containing comprehensive data on the capacities and construction of its Super Service 21, 24, and 28-inch direct drive upright metal drilling machines designed particularly for the mass production industries. Copy of Booklet U-27 free upon request.

Micro Supreme

LAY-OUT AND IDENTIFICATION DYE

12 COLORS*

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of stock and parts . . . Shows up in sharp relief—dries instantly—easily removed...Write for circular.

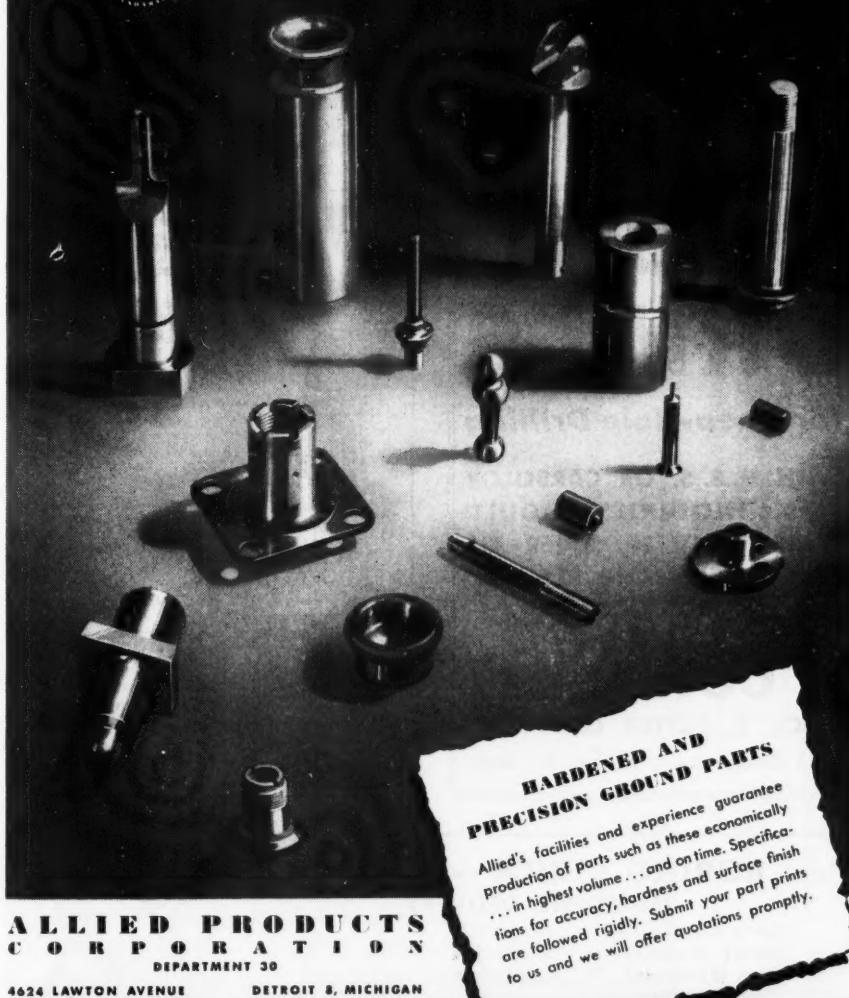
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Allied's facilities and experience guarantee production of parts such as these economically ... in highest volume ... and on time. Specifications for accuracy, hardness and surface finish are followed rigidly. Submit your part prints to us and we will offer quotations promptly.

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SPECIAL COLD FORGED PARTS • STANDARD CAP SCREWS • HARDENED AND PRECISION GROUND PARTS
SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM HEATED PLASTIC MOLDS
SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS SUPPLIES

Leiman Vacuum Pumps and Pressure Blowers. A bulletin published by Leiman Brothers, Inc., 166 C-W-1 Christie St., Newark 5, N. J., contains numerous blueprint illustrations depicting the use of vacuum pumps and pressure blowers for agitating liquids, instrument testing, water pump priming, vacuum chucking, transferring chemicals, heating, drying, evaporating, impregnating, boosting gas and air, paper feeding, and so on. Copy of Bulletin No. 52445 is available free to individuals addressing requests on their company letterheads.

Machine Shop Equipment. A 125-page fully illustrated catalog describing a wide variety of drills, reamers, cutting and lathe tools, vises, and allied equipment and accessories for use in the machine shop is now being distributed by the Eastern Tool Supply Co., 176 Grand St., New York 13, N. Y. General information, specifications (where appropriate), and prices are given on all items included in the catalog, copy of which is available free to mechanical executives addressing requests on their company letterheads.

GUN DRILLS

for Deep-Hole Drilling

**WITH H. S. S. OR CARBOLOY
TIPS. INQUIRIES SHOULD
STATE DIAMETER, OVER-ALL
LENGTH, SIZE AND STYLE OF
ADAPTOR.**

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TOOL & CUTTER COMPANY**

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IMMEDIATE DELIVERY

Body Diameter— $1\frac{1}{2}$ "; length $1\frac{3}{4}$ "

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Tool Movement— $\frac{3}{8}$ " adjustable in thousandths

Tool Diameter— $\frac{3}{8}$ "

Hardened and tempered screw, tool block and shank.

SPECIAL SHANKS AVAILABLE.

SMITH BORING CHUCK CO.

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PATS PENDING.

DRILL 6 HOLES AT ONE STROKE—ADJUSTABLE FOR ANY PATTERN

Multiply the production of every drill press . . . make your single spindle tools do the work of 6 with the Multi-Drill attachment. Six spindles are quickly and easily positioned to any hole pattern by simple adjustments of the locating arms. Fits any drill press. Standard Multi-Drill Spindles using $\frac{1}{8}$ " to $\frac{1}{2}$ " drill size handle any hole pattern on or within 5" circles— $\frac{1}{8}$ " minimum centers. **SAVE:** Drilling time, Set-up time, Equipment investment, Floor space.

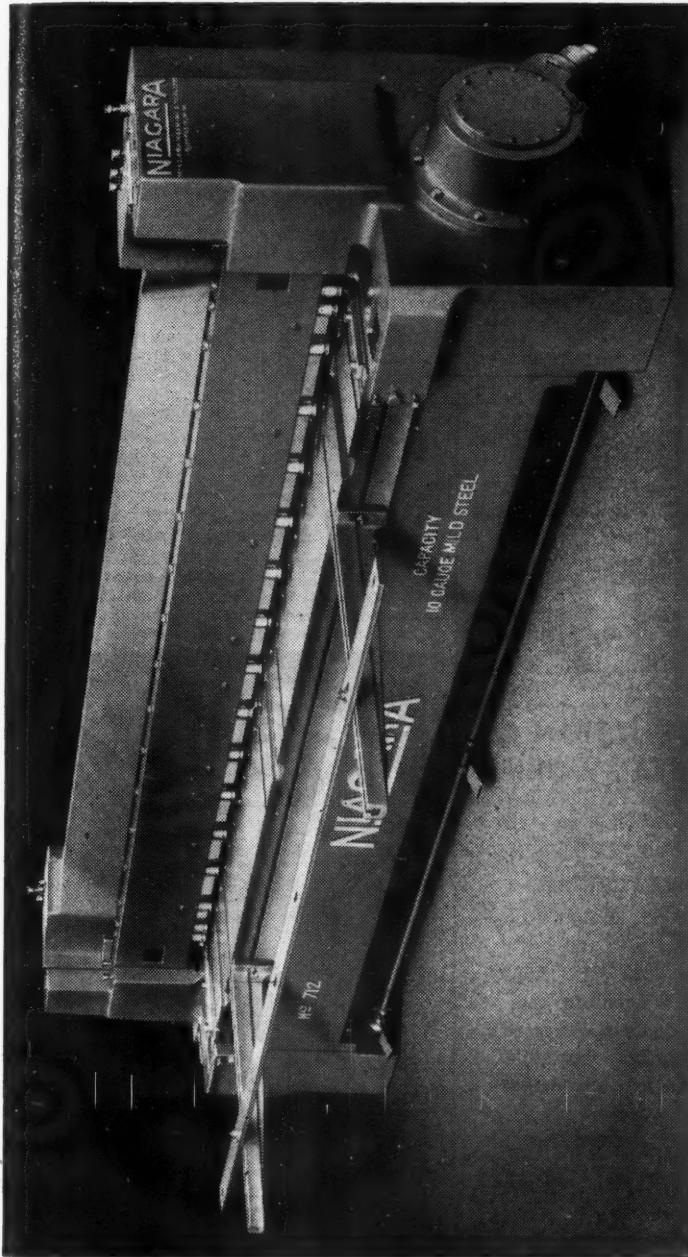
NOTE: Special spindles are available to permit use of drills $\frac{1}{8}$ " to $\frac{3}{8}$ " diameter with corresponding minimum centers of $\frac{1}{2}$ " and $\frac{3}{4}$ ".

Write for catalog sheets and complete details.

COMMANDER MFG. CO.
4224 W. Kinzie St., Chicago 44

ADJUSTABLE TO ANY DESIGN



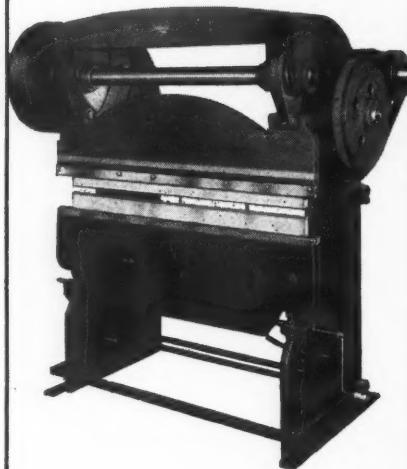


More production per hour on shearing long sheets is made possible by the advanced design of Niagara Power Squaring Shears. Features include accurate, flat cutting; convenient handling of stock and offcut; more working strokes per hour; instant-acting 14-point engagement sleeve clutch; gears mounted between anti-friction bearings; clutch and gears operate in oil-tight case; self measuring; parallel back gage. Write for Bulletin. Niagara Machine & Tool Works, Buffalo 11, N. Y. District Offices: Cleveland, Detroit, New York.

Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Shearing Shears. Also factory grinding service by the same skilled men who grind new Niagara knives.

CHICAGO STEEL PRESS BRAKE

New Type "300"



SPEED PRODUCTION OF SHEET METAL WORK

USE FOR

1. FORMING 2. EMBOSsing
3. MULTIPLE PIERCING
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The New Type "300" CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

DREIS & KRUMP MFG. CO.

7418 LOOMIS BLVD. • CHICAGO 36
ILLINOIS

"Hallowell" Shop Equipment. The Standard Pressed Steel Co., Jenkintown, Pa., now has available a 40-page catalog which provides illustrated, descriptive, and tabular information on its line of "Hallowell" Shop Equipment, including bench legs, chairs and stools, cabinets, dollies, drawers, drawer tier units, foreman's desks, locker room benches, stock carts, tables, tool stands, tote boxes, welding tables, workbenches, and other equipment. Copy free to mechanical executives upon request.

Di-Acro Catalog No. 46-10. The material contained in this 40-page catalog, publication of the O'Neil-Irwin Manufacturing Co., Minneapolis 15, Minn., summarizes the developments which have been made in "Die-Less Duplicating" during the war years and are now being diverted to the channels of peacetime development work and production. Complete descriptions and illustrations of the company's latest models of benders, shears, and brakes are provided throughout the catalog, together with information on their application. Copy free upon request.

25 YEARS OF
PERFORMANCE

*That's why
so many buy*

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FILES

M. A. **FORD** MFG. COMPANY, INC.
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OWNERS OPERATORS

**IMMEDIATE
DELIVERY
ARC WELDERS...
RELATED EQUIPMENT**

New and used arc welders of well known makes, including Hobart, Lincoln and Westinghouse, in 200, 300 and 400 ampere ratings, either AC or DC, are now included in government-owned surplus and are available for immediate purchase and delivery.

Here you will find the equipment to modernize your shop—to replace worn-out or obsolete welders—to expand your business.



Lincoln—In all models and most ratings. Hundreds in the popular 300-400 Ampere size.



Hobart—Standard models of this make available in large quantities and most ratings.



Westinghouse—Portable models available in limited quantities.



Electrodes and Welding Rods—Millions of pounds available in all types and sizes.

EXPORTERS: Most surplus property is available to the export market. Some surplus items may be withheld from export, and if such items appear in this advertisement they will be so identified by an asterisk.

Prices are low, based on the type and condition of the equipment. The inventory is located at various points throughout the country. It is broad and includes the machines you need. To obtain complete information on the availability, location and condition of the equipment you want fill out the coupon and send it to your nearest War Assets Administration Regional Office.

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Please send me complete information on the availability, condition and location of the following types of equipment.

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All we are subject to military regulations. VETERANS OWNERS OF WAR II are entitled to be certified at the War Assets Administration Certifying Office nearest their state and then to purchase the material offered.

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Antonio • San Francisco • Seattle • Spokane

EAB-1

A.G.F. Heat-Treating Equipment. The American Gas Furnace Co., Elizabeth, N. J., now has available a 28-page pocket-size catalog providing illustrated, descriptive, and tabular information on gas carburizers, pot furnaces, continuous heating machines, forges, blowpipes and burners, rotary tempering machines, melters, high speed furnaces, oven furnaces, bell-oven furnaces, automatic quenching tanks, tube furnaces, pyrometers, and blowers. Copy of Catalog No. C-1302 free upon request.

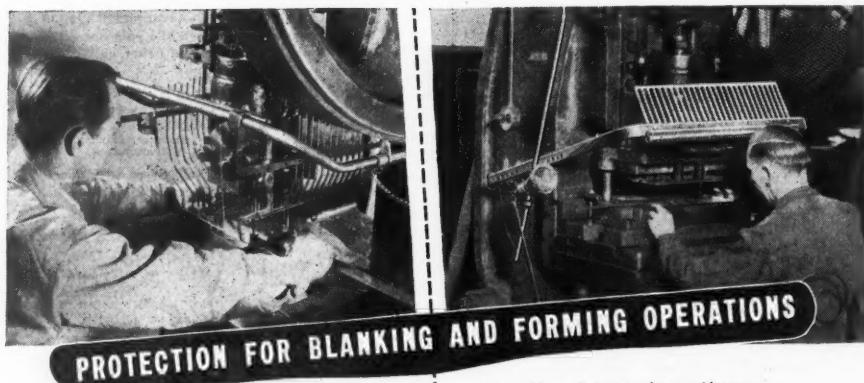
"The Effect of Moisture on the Work Value of Glue-Bonded Coated Abrasives" is the subject of Bulletin No. 5 in the series of informative bulletins currently being published by the Clover Manufacturing Co., Norwalk, Conn., and written by E. B. Gallaher, M. E. Copy of this eight-page bulletin is available free.

PRESSES
FEEDS
AUTOMATIC
EQUIPMENT

The V & O Press Company, Incorporated
HUDSON, NEW YORK

Sibley 20-Inch Drilling Machine with motor drive and belt guard is covered as to standard features, specifications, operation, and so on, in a four-page illustrated catalog now being issued by the Sibley Machine & Foundry Corp., 206 E. Tutt St., South Bend 23, Ind. Copy of Catalog No. 65 free upon request.

Taylor & Fenn XM-125 Drilling Machine with spindle speeds suitable for wire size drills and the usual variety of straight shank drills up to and including $\frac{3}{8}$ -inch diameter is shown and described in a bulleten issued by the Taylor & Fenn Co., Hartford, Conn. Copy free.



Above: Swinging Die Closure adaptable to wide variety of blanking operations. Easily adjustable to any size die.

Complete protection—press cannot operate with guard out of position. Splinter proof, transparent plastic front.

Above: Automatic safety guard for use on all type presses. Operates from foot pedal, falls by gravity to bolster plate. Counterbalanced and cushioned to avoid injury. Press cannot operate until guard is in complete protective position.

For detailed information on the above safety appliances write for this free booklet: "Power Press Protection," Junkin Safety Appliance Co., Inc., 936 W. Hill St., Louisville 4, Ky.



Junkin
POWER PRESS GUARDS

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FOR IMMEDIATE SALE

Standard and Non-Standard O. D.'s and Wall Thicknesses
Range of Sizes from $\frac{1}{4}$ " to 7"



Types: Carbon, Alloy, and Some Stainless;
Both Welded and Seamless.

Price: ALL TO BE SOLD ON FIXED PRICE BASIS,
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Delivery: Subject to Arrangement at Time of Sale Between
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**Where
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Regional Office Below, indicating the type, size and
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Orders received by 5 P. M. November 4, 1946
will be filled in the following sequence, as
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and the location of the Certifying Office must
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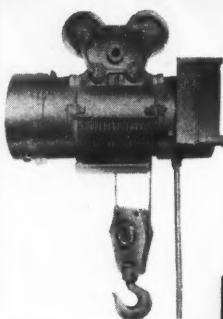
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(it has everything it takes)

ELECTRIC cable HOIST



New in Size
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is
New in Design
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OLD IN EXPERIENCE

We were not handicapped in our start by having former designs, equipment and parts to consider.

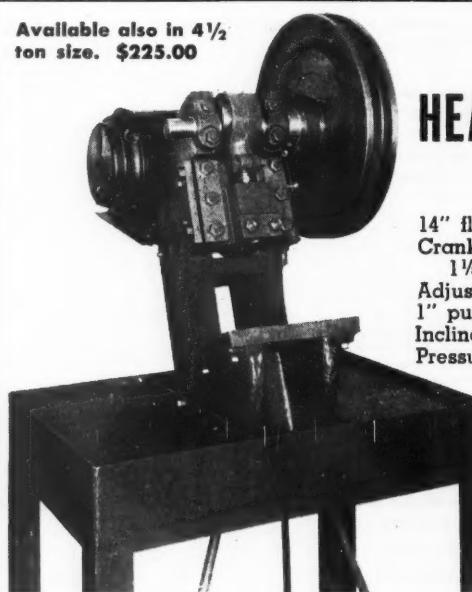
We designed and built, with the world's experience before us, and we have given you the best. Write for interesting Bulletin.

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PIONEERS OF BETTER HOISTS, LIFTING AND CONVEYING EQUIPMENT
DIVISION OF THE WRIGHT FILE CO.

LISBON, OHIO

Available also in 4½ ton size. \$225.00



6-TON HEAVY DUTY PRESS \$240. Less Motor

14" flywheel, 2 groove—72 lbs.
Crankshaft bronze bearings: 1 7/8" x 2 1/4",
1 1/8" x 1 1/4".

Adjustable ball joint, 1 1/8".
1" punch hole.
Inclinable, 38 degrees.

Pressure at bottom of ram, 6 ton.
Bolster plate, 7/8" x 6" x 8". Opening,
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1" stroke. Non-repeat clutch.
Steel table, 18" x 21" x 28". Shipping weight, 300 lbs.

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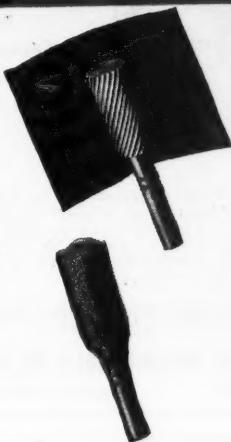
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Plants: New York



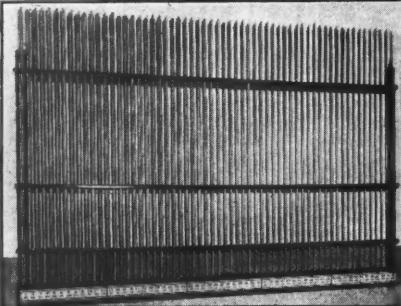
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Handles rods from 3" to 36" lengths. Made of sheet metal and supporting strap iron. Comes knocked down—easily assembled in 5 minutes. • Number size rack holds No. 1 thru No. 60. Fractional size rack holds 1/32" thru 17/32" by 64ths. • Number or fractional indexes easily read by aid of decimal equivalent. **Open territory available.**

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Boring
Bars
Capacity
from $\frac{3}{8}$ "
to 2".

Featuring RIGID Construction — SIMPLICITY of design — MAXIMUM tool RIGIDITY — FULL OFFSET in EITHER DIRECTION — Inter-changeable FRICTION-LOCK ADAPTERS, THREE positions for tool or boring bar.

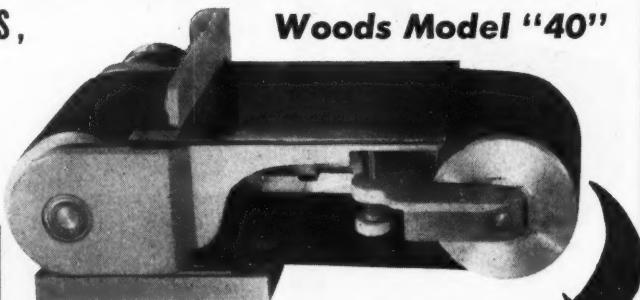
For complete and detailed information write for Folio No. 10.

R. W. RUNDE MACHINE TOOL & DIE CO.
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FOR METALS,
PLASTICS,
RUBBER,
WOOD, GLASS

Used Either Vertical
or Horizontal



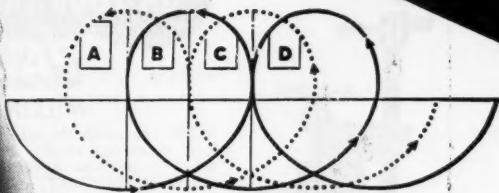
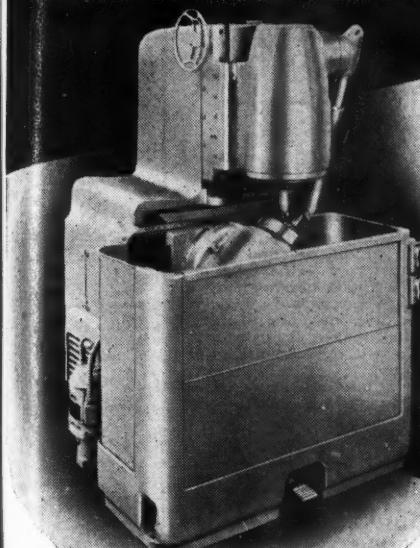
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• Perfectly Balanced Pulleys • Tested to 5000 RPM • 5" x 8½" Work Area, 36" Belt
A husky ball-bearing sander and tool grinder built for maximum efficiency, smooth operation and long life. Reversible platen usable on either face. Dealer inquiries invited.

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SANDER
COMPLETE WITH
BELT AND WORK DAM
\$39.95

HIGH SPEED AUTOMATIC Gear Tooth Pointing



for **LARGE SHOPS**
or **SMALL SHOPS**
with the
CROSS N^o 60

Continuous rotary cutting with an economical new type inserted blade cutter enables the Cross No. 60 to point 1800 gear teeth a minute under average conditions. The diagram illustrates this Cross idea of synchronizing the motions of the gear and the cutter to produce more work accurately and *automatically*. The solid line traces the path of one cutter lip, the dotted line the path of the other.

And several exclusive Cross features make the No. 60 ideal for smaller shops where short runs on a variety

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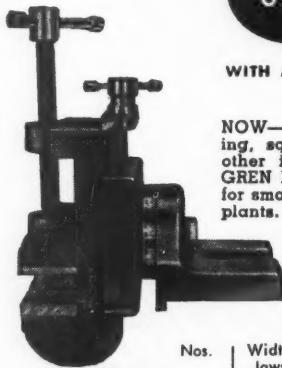
These and other features of the Cross No. 60 are explained in a special bulletin which is yours for the asking. Just write The Cross Company, Detroit 7, Michigan.

CROSS

Detroit

Machine Tools

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ON YOUR LATHE



WITH A

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MILLING ATTACHMENT

NOW—you can do milling, slotting, grinding, grooving, squaring shafts, sawing at angles, and many other important operations on your lathe. PALMGREN MILLING ATTACHMENT is a necessary fixture for small shops, schools and emergency work in large plants. Fits South Bend, Atlas, Craftsman, Logan, Sheldon and all other makes. It has graduation for rotary angle adjustments, also graduated feed and adjustment screw. Easily mounted by straddling lathe's regular tool post. Try one—it will quickly pay for itself.

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| 150 | 1½" | 1" | 1½" | 6½ | 1" | \$18.75 |
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Order from your dealer or jobber. Write for circular No. 350.

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Mfrs. of PALMGREN PRODUCTS for over 28 Years
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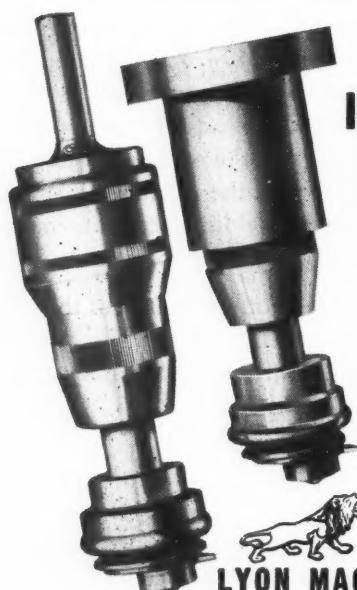


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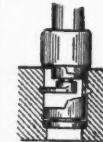
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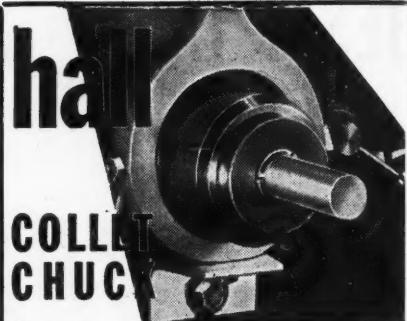
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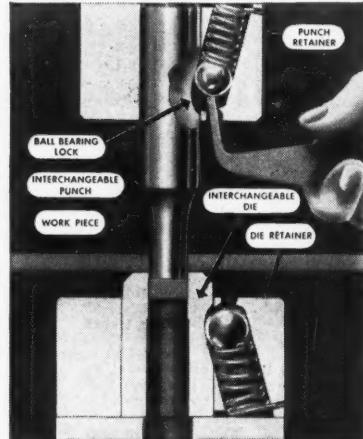
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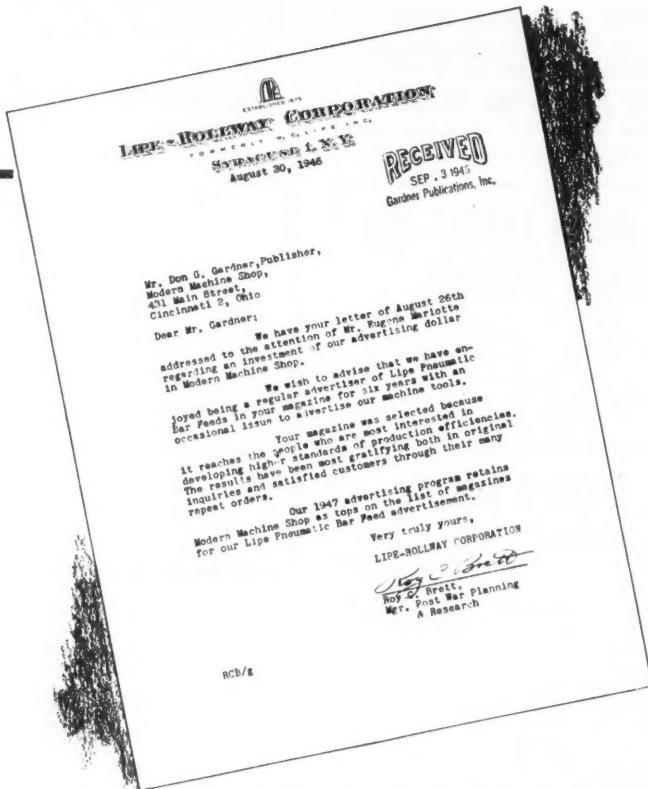
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WHERE TO GET IT

Abrasive Cloth, Paper, Discs, Belts, Stones, Etc., 213, 233, 33, 34, 48, 49, 292

Abrasive Renewing Materials, 332

Air-Operated Equipment (Look for specific item)

Alloys, 345

Angles, 67, 333, 349

Arbors, 215

Backstands, 352

Balancing Machines, 361, 7, 41

Balancing Ways, 337, 397

Bar Stock, 171

Bearings, Ball, First Cover, 242

Bearings, Oilless, 351

Bearings, Roller, First Cover, 260, 1

Bearings, Sleeve, 171, 253

Bearings, Special, 241

Bearings, Thrust, First Cover

Belt Fasteners, 321

Belts, Backstand, 233

Belt Lacing Equipment, 321

Benches, Work, 357

Bending Machines, 179, 212, 327

Bins, 186

Bits, Power, 20

Blades, Centerless Grinder, 136

Blades, Cutting-Off, 226

Blades, Insert, 195

Blocks, V, 333

Blowers, 119

Boring Bars, 195, 249, 166, 167

Boring, Drilling and Milling Machines, Horizontal, 166, 167

Boring, Drilling and Tapping Machines, Multiple, 281, 40

Boring Heads, 245, 140, 158, 382

Boring Machines, 166, 167

Boring Mills, Vertical, 10

Boxes, Shop, 290

Brakes, Press and Bending, 179, 143, 65, 376, 357, 359, 24, 25

Broaches, 195, 118, 54, 244

Broaching Fixtures, 195

Broaching Machines, 79, 8, 9

Bronze Bars, 171

Brushes, Wire Wheel, 395

Buffers, Portable Electric, 404

Buffing Machines, 102

Burrs, 99

Bushings, Drill Jig, 311, 334, 386

Bushings, Sleeve, 351

Calipers, 58, 351

Carbides, 326

Centering Machines, Automatic, 16

Centers, Lathe, Planer, Miller, Etc., 259, 117, 299, 338, 397

Chasers, 111, 16

Checking Rolls, 307

Chucking Machines, Automatic, 257

Chucks, Air, Second Cover

Chucks, Boring, 374

Chucks, Collet, 258, 386

Chucks, Drill, 316, 12, 13, 15, 20

Chucks, Lathe, 169, 251, 115, 89, 397

Chucks, Magnetic, 183, 115, 176

Chucks, Tap, 20

Chucks, Universal, 115

Chucks, Wire, 262

Circle Cutting Machines, 144

Clamps, 225, 237, 122, 107, 90, 270

Clamps, Air, 297

Clutches, 55, 303

Collets, 15

Comparators, 16

Compressors, Air and Gas, 207, 227, 119

Controlling Devices, 257

Coolants, 165, 160, 147, 108

Counterbores, 195, 67, 39, 294

Countersinks, 195

Cranes, 177, 380

Cut-Off Machines, 57

Cutter Sharpening Machines, 8, 9

Cutters, Milling, 195, 308, 328, 400

Cylinders, Hydraulic and Pneumatic, 141, 103, 94, Second Cover

Demagnetizers, 115, 397

Diamonds and Diamond Tools, 269, 363

Diamond Wheels, 32

Die Cushions, Pneumatic, 322

Die Heads, Threading, 2, 111, 16

Dieing Machines, 71

Diemakers' Supplies, 373

Die Making Machines, 359

Dies, 175, 182, 261, 257, 50, 294, 296, 16, 373, 386

Die Sets, 265, 319

Die Sinking Machines, 8, 9

Dividing Heads, 137, 115, 282, 27, 28, 29

Dogs, Lathe, Grinder and Miller, 237, 122

Drafting Materials, 302

Dressing Fixtures, Grinding Wheel, 187, 199, 114, 348, 27, 28, 29, 397

- Dressing Tools.** 199, 269, 369, 33, 196
Drill Guides. 300
Drill Heads. 66, 374, 254, 288, 317, 364
Drilling and Tapping Units. 101, 212
Drilling Machines, Bench. 188, 246, 17
Drilling Machines, Multiple Spindle. 228, 17, 22
Drilling Machines, Radial. 151, 135, 57, 313, 14
Drilling Machines, Unit Type. 101
Drilling Machines, Vertical. 135, 85, 84, 57, 17,
22
Drilling Units. 40
Drills, Center, Core, Twist, Square, Etc. 195,
98, 39, 365, 367, 276, 361, 370
Drills, Portable Electric. 191, 159, 63, 395, 404
Drills, Portable Pneumatic. 119
Drives. 177, 263, 243, 250
Drives, Motor. 177, 263, 243, 43, 356
Dust Control Equipment. 56, 62, 312, 397, 404
Engines, Diesel. 207, 119
Engraving Machines. 280
Etchers. 298, 397
Facing Heads. 158
Fans. 177
Feed Units. 217, 378
Files. 153, 267
Files, Band. 81, 302
Files, Rotary. 145, 81, 376, 15, 381
Filters. 190
Finishing Machines. 3
Flexible Shaft Equipment. 193, 57, 345, 15
Furnaces, Heat-Treating. 211, 283, 221
Gage Blocks. 291, 113, 81, 330
Gages. 169, 149, 133, 113, 105, 172, 205, 318, 344,
27, 28, 29
Gear Boring Machines. 133
Gear Chamfering Machines. 133
Gear Cutting Machines. 277, 304, 11
Gear Measuring Instruments and Machines. 113
Gears and Gear Units. 178, 258, 272, 308, 310,
370, 5
Gear Tooth Pointing Machines. 383
Graphites. 194
Grinders, Abrasive Belt. 371, 358
Grinders, Air. 47, 230, 298
Grinders, Bench. 231
Grinders, Carbide Tool. 201, 343
Grinders, Chucking. 149
Grinders, Cutter and Tool. 75, 71
Grinders, Cylindrical. 72
Grinders, Drill. 71
Grinders, Face Mill. 71
Grinders, Gear. 27, 28, 29
Grinders, Internal. 255, 3
Grinders, Pedestal. 263
Grinders, Portable and Tool Post. 275, 285
Grinders, Portable Electric. 63, 250, 395, 404
Grinders, Profile. 35
Grinders, Saw. 232
Grinders, Special Purpose. 133
Grinders, Surface. 81, 68, 60, 64, 324, 3, 6, 21
Grinders, Swing Frame. 212
Grinders, Thread. 133, 16
Grinders, Universal. 183, 255
Grinding Fixtures and Attachments. 187, 112,
155, 385
Grinding Wheels. 202, 203, 120, 33, 44, 48, 49,
32, 385
Guards, Gear. 340
Guards, Press. 378
Guns, Air. 190, 354
Gun Drills. 374
Hammers. 350
Hammers, Forge, Power-Driven. 168
Hammers, Nylon. 239
Hammers, Portable Electric. 250
Handles, Machine. 286
Hand Tools, Power (Look for specific item)
Handwheels. 286
Hardness Testing Devices. 88, 81, 307
Hinges. 172, 347
Hoisting and Conveying Machinery. 177, 227,
100, 250, 380
Holders, Tap. 116, 368
Holders, Tool. 237, 122, 117, 52, 226, 20
Holders, Type. 254, 294
Hole Locators. 338
Hones, Portable Cylinder. 219
Honing Machines. 219
Honing Stones. 33
Hopper Units, Motorized. 295
Hydraulic Equipment (Look for specific item)
Indicators. 45, 58, 307
Inspection Devices. 81
Iron Working Machines. 30, 31
Jacks. 122, 248
Jig Borers. 81, 236, 325
Jigs and Fixtures. 169, 305, 27, 28, 29, 373
Joints, Universal. 20
Keys, Socket Screw, Fourth Cover
Keyway Cutting Machines. 296, 355
Knives. 361, 375
Knobs, Machine. 286
Knurls. 363
Lapping Compounds. 48, 49
Lapping Heads. 74
Lapping Machines. 231
Lathe Converters. 235
Lathes, Automatic. 7, 16, 18, 19, 23, 41
Lathes, Bench. 148, 293
Lathes, Engine and Toolroom. 151, 289, 96, 91,
84, 76, Third Cover, 146, 212, 238, 252, 342
Lathes, Polishing. 57, 352
Lathes, Speed. 46
Lathes, Turret. 91, 87, 7, 16, 18, 19, 41
Layout Materials. 174, 372
Lead Products. 350
Lvers, Pull-Feed. 286
Lift Trucks. 372
Lighting Equipment. 266
Light Wave Measuring Equipment. 113
Locating Tools, Optical. 288
Lubricants. 160, 147, 108
Magnifiers. 282
Mallets, Rawhide. 335
Mandrels, Expanding. 339, 360
Marking Machines. 106, 310
Metallizing Equipment. 270
Micrometers. 58
Milling Machine Attachments. 97, 301, 384
Milling Machines, Automatic. 8, 9

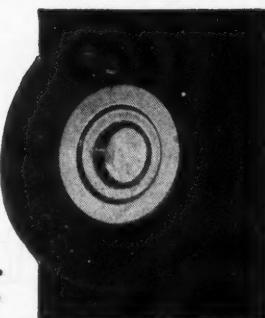
- Milling Machines, Bench, 80, 293
 Milling Machines, Horizontal, 84, 80, 180, 236
 Milling Machines, Profile, 8, 9
 Milling Machines, Turret, 38
 Milling Machines, Vertical, 181, 97, 236, 325, 8, 9
 Mills, End, 195, 215, 98, 77, 39
 Molds, 373
 Motors, 177, 209, 263, 57, 300
 Mounted Points and Wheels, 189
 Nibblers, 63, 323, 329, 332
 Numbering Machines, 341
 Oilers, 347
 Oils, Grinding, 108
 Pans, Tote, 276
 Parallels, 67
 Parts, Machine, Aircraft, Production, Etc., 169, 207, 133, 299, 302, 27, 28, 29, 373
 Pinion Cutting Machines, 304
 Pins, 248, 341
 Planer-Millers, 10
 Planers, 53, 10
 Plates, Angle, 67
 Plates, Index, 27, 28, 29
 Plates, Lapping, 67
 Plates, Surface, 240, 320, 397
 Polishing Machines, 102
 Polishing Wheels, 44
 Power Units, Hydraulic, 43
 Presses, Arbor, 173, 43
 Presses, Hydraulic, 173, 69, 65, Second Cover, 43, 83
 Presses, Punch, 92, 78, 378, 380, 252, 268, 24, 25
 Protection Caps, 355
 Pullers, 229, 318
 Pumps, 177
 Pumps, Coolant and Lubricant, 271, 287, Second Cover
 Pumps, Hydraulic, 95, 82
 Pumps, Vacuum, 207, 214
 Punches, 175, 373, 386
 Punch Press Feeds, 217, 378, 366
 Racks, Bar and Tube, 272, 382
 Reamers, 195, 197, 39, 320, 346
 Reamers, Portable Electric, 368
 Rectifiers, 115
 Regulators, 190, 109
 Resurfacing Materials, Floor, 332
 Rings, Retaining, 59
 Riveting Machines, 141, 256
 Rust Preventives, 160
 Safety Equipment Press, 378, 198, 353
 Sanders, Portable Electric, 63
 Sanding Machines, 382
 Saw Blades, Band, 45, 315
 Saw Blades, Circular, 120, 361
 Saw Blades, Hack, 104, 45, 315, 349, 206, 26
 Saw Frames, Hack, 315
 Sawing Machines, Band, 223, 81, 57
 Sawing Machines, Circular, 234
 Sawing Machines, Hack, 115, 95, 36, 306, 26
 Saws, Portable Electric, 63
 Saws, Slitting, 86
 Scrapers, Hand and Power, 341
 Screw Drivers, Hand, 20
 Screw Drivers, Portable Electric, 207
 Screw Machines, Automatic, 281, 37
 Screws, Cap, Set, Socket and Machine, 247, Fourth Cover, 208, 314, 373
 Screws, Transfer, 264, 338
 Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, Etc., 136, 133, 258, 319, 387, 388, 389
 Shaper-Planers, 53
 Shapers, 143, 84, 51, 53, 236, 274
 Sharpening Fixtures, 400
 Sharpening Machines, 256
 Shearing Machines, 179, 143, 304, 357, 375, 144
 Shears, Portable Electric, 63
 Shims, 340, 27, 28, 29
 Sine Bars, 58
 Slotting Machines, 81, 53, 274
 Sockets, 237, 122, 20
 Soldering Irons and Tips, 260
 Solenoids, 257, 73
 Special Machinery, 7, 41, 4
 Spot Facers, 195, 67, 39, 294
 Stamps, 254, 294, 308, 363
 Steel, Die, 185, 81
 Steel, General Purpose, 120
 Steel Stock, Ground Flat, 45
 Stock Stands, 272
 Stops, Lathe, 110
 Straightedges, 67
 Straightening Machines, 69
 Superfinishing Machines, 7, 41
 Surfacing Machines, Abrasive, 57, 280
 Tables, Elevating, 246
 Tables, Rotary and Index, 244, 358, 362
 Tachometers, 397
 Tapes, Measuring, 45
 Tap Extractors, 351
 Tappers, Hand, 265, 364
 Tapping Attachments, 42, 278, 15
 Tapping Machines, 116, 246, 18, 19
 Taps, 216, 261, 257, 204, 309, 336, 347, 385
 Taps, Collapsible, 2
 Threading Machines, 2, 70, 18, 19
 Tool Bits, 182, 185, 195, 279, 93, 52, 308
 Tool Blanks, 308
 Tools, Boring, 195, 210
 Tools, Cutting-Off, 195, 161
 Tools, Form, 195, 258
 Tools, Grooving, 384
 Tools, Special Cutting, 169, 172, 258, 326
 Tool Stands, 357
 Traps, Air, 353
 Tubing, 379
 Turrets, Lathe, 61, 282, 284, 306
 Valves, 271, 141, 103, 95, 73
 Vises, Bench and Machine, 190, 199, 273, 122, 115, 222, 224, 270, 344, 27, 28, 29
 Wear Parts, 326
 Welding Equipment and Supplies, 156, 157, 170, 331, 355, 24, 25, 377
 Wire Stripping Machines, 343
 Wrenches, 237, 122, 20

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Over the Editor's Desk

SINCE the thirteen original American colonies pooled their efforts and resources and cut loose from the "mother country," nearly 175 years ago, the United States has grown in size, power and prestige. For 100 years the rest of the world has regarded this country as the Promised Land—the land of freedom and opportunity. Many of the American presidents—Washington, Lincoln, Theodore Roosevelt and others—are counted among the great men of all time. Other nations have modeled their constitutions and governmental structures after our own.

Throughout scores of years ship after ship brought liberty-loving people to our shores. In short; this country has long been considered the Mecca of the oppressed; an example of democracy for the other nations of the Earth.

Within a few short years this regard has been badly shattered; today America is all but a failure and a laughing-stock to the rest of the world. The respect and high regard in which America has been held by the people of other countries in the past has faded to ridicule as the world has watched the president of this great nation fill government offices with his neighborhood cronies, make decisions that favor his political party without regard for the welfare of the nation, and fail as a leader of his own cabinet.

America's vaunted production capacity has been stifled by strikes which are holding up the distribution of much-needed merchandise; strikes are shutting off the supplies of food to the cities; strikes are holding up the manufacture of parts needed for automobiles, trucks and tractors; strikes are responsible for the present shortages in coal and steel—all of which is throwing thousands of employees out of work.

With the whole nation in need of merchandise of all kinds; with the greatest backlog of orders in the history of the country, America is practically on the verge of a depression, brought on by irresponsible unions.

There is an old saying "Whom the gods would destroy, they first make mad." If the gods wanted to destroy America, they couldn't do it any easier or more effectively than by getting the American people to place their government in the hands of a flock of party-bound politicians tied in with a group of irresponsible labor leaders.

Cannot the American people see what is taking place? Must America become a symbol of the failure of democratic government? Must America go down to the verge of economic and industrial chaos before its people awaken?





ALFRED MARCHEV
President, Republic Aviation
Corporation



ALBERT M. SARGENT
President, American Society
of Tool Engineers



HARRY E. CONRAD
Executive Secretary, Ameri-
can Society of Tool Engineers

A.S.T.E. Semi-Annual National Convention

to be held in Pittsburgh, Pa., October 10, 11 and 12

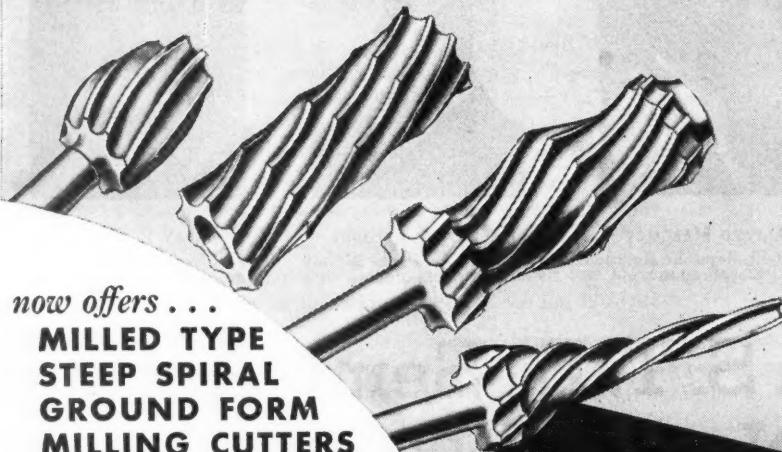
AN excellent program on subjects connected with tooling and manufacturing methods awaits the visitors to the Semi-Annual National Convention of the American Society of Tool Engineers, to be held at the William Penn Hotel, Pittsburgh, Pennsylvania, October 10, 11 and 12, 1946. In addition to the many papers that will be read, a number of tours have been arranged through Pittsburgh manufacturing plants, with a special trip through the Buhl Planetarium and Institute of Popular Science.

The convention will end Saturday evening, October 12, with a banquet at which Mr. Alfred Marchev, President of the Republic Aviation Corporation, will speak on the subject "What Price Airplanes." Mr. Marchev will tell how his firm was able to reduce the price of its "Seabee" airplane from

\$15,000 to \$4,450 by adopting mass production techniques developed by American tool engineers, and will outline methods by which planes may be produced in such numbers and at such low costs that the plane can become as much a part of everyday life as did the automobile after World War I.

Technical developments have been coming fast in recent months, and the Pittsburgh meeting is planned to bring the tool engineer and production plant executive up to date on modern manufacturing practice. At this convention the A.S.T.E. will officially initiate a new Information Service, through which both industry and the general public can get a closer look at tool engineering and a better understanding of the part that tool engineering plays in the production of "better things for more people."

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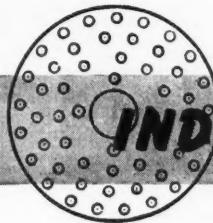
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INDEX TO ADVERTISEMENTS

| | | | |
|---|-----|---|--------|
| Abart Gear & Machine Co. | 310 | Carboloy Co., Inc. | 279 |
| Aber Engr. Works Inc. | 328 | Carborundum Co. | 48, 49 |
| Abrasice Machine Tool Co. | 21 | Carlton Machine Tool Co. | 313 |
| Accurate Bushing Co. | 311 | Carroll-Jamieson Machine Tool Co. | 252 |
| Ace Mfg. Corp. | 299 | Center Scope Products Co. | 288 |
| Acme Industrial Co. | 334 | Center Tool Co. | 258 |
| Acme Machine Tool Co. | 37 | Cerro de Pasco Copper Corp. | 345 |
| Acme Tool Co. | 67 | Chandler Tool Co. | 158 |
| Acromark Co. | 254 | Chicago Gear Works | 258 |
| Adamas Carbide Corp. | 326 | Chicago Pneumatic Tool Co. | 207 |
| Advance Machine Works | 270 | Chicago Rawhide Mfg. Co. | 335 |
| Aget-Detroit Co. | 62 | Chicago Tool & Engr. Co. | 384 |
| Air-Way Pump & Equipment Co. | 354 | Chicago Wheel & Mfg. Co. | 189 |
| Albertson & Co., Inc. | 213 | Climcool Div., Cincinnati Milling | |
| Alco Tool Co. | 110 | Machine Co. | 165 |
| Allied Products Corp. | 373 | Cincinnati Bickford Tool Co. | 135 |
| Almond Mfg. Co., T. R. | 316 | Cincinnati Electrical Tool Co. | 404 |
| American Measuring Instruments Corp. | 351 | Cincinnati Gear Co. | 272 |
| American Pipe Bending Machine Co., Inc. | 327 | Cincinnati Lathe & Tool Co. | 342 |
| American Swiss File & Tool Co. | 267 | Cincinnati Milling Machine Co. | 8, 9 |
| American Tool Works Co. | 151 | Cincinnati Planer Co. | 10 |
| Anderson Bros. Mfg. Co. | 337 | Cincinnati Shaper Co. | 143 |
| Apex Machine & Tool Co. | 20 | Circular Tool Co., Inc. | 86 |
| Armour Sandpaper Works, Div. of | | Cities Service Oil Co. | 160 |
| Armour & Co. | 34 | Clark Instrument, Inc. | 307 |
| Armstrong-Blum Mfg. Co. | 26 | Clemson Bros., Inc. | 315 |
| Armstrong-Bray & Co. | 318 | Cleveland Punch & Shear Works Co. | 175 |
| Armstrong Bros. Tool Co. | 122 | Clipper Belt Lacer Co. | 321 |
| Arter Grinding Machine Co. | 72 | Colonial Bushings, Inc. | 386 |
| Atlantic Gear Works | 178 | Comet Tool Co. | 210 |
| Atlas Press Co. | 84 | Commander Mfg. Co. | 374 |
| Auburn Ball Bearing Co. | 242 | Commercial Centerless Grinding Co. | 248 |
| Auto Engraver Co. | 280 | Comtor Co. | 344 |
| Automatic Machine & Tool Co. | 306 | Conant Tool & Engr. Co. | 244 |
| Auto Moulding & Mfg. Co. | 347 | Conner Tool & Cutter Co. | 374 |
| Avey Drilling Machine Co. | 22 | Consolidated Mchry. & Supply Co., Ltd. | 234 |
| Axeison Mfg. Co. | 76 | Continental Tool Works, Div. of | |
| Baker Brothers, Inc. | 40 | Ex-Cell-O Corp. | 195 |
| Bath & Co., Inc., John. | 216 | Cook, Inc., Lawrence H. | 350 |
| Baumbach Mfg. Co., E. A. | 319 | Cooley Electric Mfg. Co. | 211 |
| Bay State Tap & Die Co. | 261 | Cosa Corp. | 35 |
| Bear Mfg. Co., Industrial Div. | 361 | Coulter Machine Co., James. | 70 |
| Benchmaster Mfg. Co. | 80 | Crater Mfg. Co. | 292 |
| Benton Co. | 249 | Criterion Machine Works | 245 |
| Besly & Co., Charles H. | 385 | Cross Co. | 383 |
| Beverly Shear Mfg. Co. | 304 | Cullen-Friestd Co. | 355 |
| Bicknell-Thomas Co. | 294 | Cunningham Co., M. E. | 363 |
| Boyar-Schultz Corp. | 74 | Curtis Pneumatic Mchry. Co. | 227 |
| Boye & Emmes Machine Tool Co. | 146 | Cushman Chuck Co. | 251 |
| Bradford Machine Tool Co. | 212 | Dahlstrom Mfg. Co. | 364 |
| Breuer Electric Manufacturing Co. | 312 | Dake Engine Co. | 173 |
| Brewer Machine Co., William F. | 380 | Danielson Mfg. Co. | 239 |
| Brewster-Squires Co. | 298 | Danly Machine Specialties, Inc. | 341 |
| Bridgeport Machines, Inc. | 38 | Davis Keyseater Co. | 355 |
| Brighton Screw & Mfg. Co. | 208 | Dayton Rogers Mfg. Co. | 322 |
| Brown & Sharpe Mfg. Co. | 77 | Dearborn, Inc., Howard | 117 |
| Brown Corp., W. R. | 190 | Delco Products Div., General Motors Corp. | 209 |
| Brown Engr. Co. | 222 | Denison Engr. Co. | 83 |
| Bryant Chucking Grinder Co. | 149 | Derbyshire, Inc., F. W. | 262 |
| Buckeye Brass & Mfg. Co. | 253 | Desmond-Stephan Mfg. Co. | 199 |
| Buffalo Forge Co. | 17 | Detroit Bevel Gear Co. | 370 |
| Buir Machine Tool Co. | 66 | Detroit Power Screwdriver Co. | 295 |
| Burdick & Co., S. J. | 318 | Dickerman Mfg. Co., H. E. | 217 |
| Burke Machine Tool Co. | 180 | Dixie Type & Supply Co., Tool & Gage Div. | 172 |
| Busch Co., J. C. | 320 | Dixon Crucible Co., Joseph | 194 |

| | | | |
|-----------------------------------|--------------|---|---------------|
| DoAll Co. | 81 | J & S Tool Co. | 114, 196, 348 |
| Dorman Machine Tool Works. | 278 | Jacobs Mfg. Co. | 12, 13 |
| Dreis & Krump Mfg. Co. | 376 | Jarvis Co., Charles L. | 15 |
| Dumore Co. | 285 | Jefferson Machine Tool Co. | 282 |
| Dykem Co. | 174 | Johnson Bronze Co. | 171 |
| East Shore Machine Products Co. | 54 | Johnson Gas Appliance Co. | 221 |
| Eastern Tool & Supply Co. | 370 | Jones & Lamson Machine Co. | 16 |
| Electro-Mechano Co. | 183 | Junkin Safety Appliance Co. | 378 |
| Electrolized Tap Corp. | 294 | Jurzek Machine & Engr. Co. | 248 |
| Enco Mfg. Co. | 61 | Kartarik, Inc. | 300 |
| Ettco Tool Co., Inc. | 42 | Kato Engr. Co. | 300 |
| Farrel-Birmingham Co., Inc. | 5 | Kempsmith Machine Co. | 97 |
| Fearless Tool Co. | 118 | Kennametal, Inc. | 308 |
| Federal Machine & Welder Co. | 24, 25 | Kingsbury Machine Tool Corp. | 101 |
| Feedrail Corp. | 100 | Knu-Vise Inc. | 90 |
| Fellows Gear Shaper Co. | 11 | L-W Chuck Co. | 115 |
| Firth-Sterling Steel Co. | 185 | Lafayette Tool & Supply Co. | 362 |
| Fonda Gage Co. | 330 | Landis Machine Co. | 2 |
| Foote-Burt Co. | 75 | Lassy Tool Co. | 333 |
| Ford Mfg. Co., M. A. | 376 | Leach Mchry. Co., H. | 64 |
| Ford Motor Co., Johansson Div. | 291 | LeBlond Machine Tool Co., R. K. | Third Cover |
| Forsberg Mfg. Co. | 349 | Leiman Bros. Inc. | 214 |
| Forthman, Cliff J. | 341 | Lewthwaite Machine Co., T. H. | 212 |
| Fosdick Machine Tool Co. | 14 | Libert Machine Co. | 144 |
| Fulfilio Specialties Co., Inc. | 271 | Lima Electric Motor Co. | 263 |
| Gairing Tool Co. | 249 | Lincoln Electric Co. | 156, 157 |
| Galland-Henning Mfg. Co. | 103 | Lincoln Park Industries, Inc. | 50 |
| Gallmeyer & Livingston Co. | 75 | Lincoln Park Mfg. Co. | 258 |
| Gammone-Hoaglund Co. | 320 | Linley Brothers Co. | 325 |
| Gardner Machine Co. | 6 | Lisbon Hoist & Crane Co. | 380 |
| Gear Grinding Machine Co. | 55 | Littleford Bros. Inc. | 340 |
| General Engr. & Mfg. Co. | 51 | Logan Engr. Co. | 289 |
| General Tool & Die Co. | 182 | Logansport Machine Co., Inc. | Second Cover |
| Geometric Tool Co. | 111 | Lucas & Son, Inc., J. L. | 276 |
| Gerotor May Corp. | 82 | Luers, J. Milton | 226 |
| Giddings & Lewis Machine Tool Co. | 166, 167 | Luma Electric Equipment Co. | 260 |
| Gilmore & Co., F. F. | 363 | Lyon Machine Co. | 384 |
| Gisholt Machine Co. | 7, 41 | Lyon-Raymond Corp. | 372 |
| Gits Brothers Mfg. Co. | 347 | M-B Products | 298 |
| Gorton Machine Co., George | 181 | Machine Products Corp. | 286 |
| Govro-Nelson Co. | 112 | Madison-Kipp Corp. | 230 |
| Graham & Co., Inc., John H. | 104 | Mall Tool Co. | 159 |
| Graham Mfg. Co., Inc. | 344 | Manhattan Rubber Division | 32 |
| Grant Mfg. & Machine Co. | 256 | Maquoketa Co. | 36 |
| Gray Machine Co. | 332 | Marquette Mfg. Co. | 170 |
| Greaves Machine Tool Co. | 368 | Martin Machine Works, J. E. | 270 |
| Greenlee Brothers & Co. | 281 | Massie Mfg. Co. | 332 |
| Grenby Mfg. Co. | 255 | Master Electric Co., Industrial Equipment | |
| Griffin Co., G. W. | 104 | Div. | 250 |
| Grinding Supply Co. | 382 | Master Mfg. Co. | 235 |
| Grob Brothers | 302 | Master Specialty Co. | 338 |
| Grobet File Co. of America | 381 | Maxwell Co., F. A. | 140 |
| Gwilliam Co. | 260 | McGonegal Mfg. Co. | 275 |
| Hall Mfg. Co. | 386 | McKiernan-Terry Corp. | 168 |
| Hamilton Tool Co. | 246 | Mead Specialties Co. | 297 |
| Hammond Mchry. Builders, Inc. | 343, 352 | Meeker Mfg. Co. | 338 |
| Hanchett Mfg. Co. | 176 | Meinhardt Diamond Tool Co. | 269 |
| Hanna Engr. Works | 141 | Metal Carbides Corp. | 93 |
| Hannifin Mfg. Co. | 69 | Metallizing Co. of America | 270 |
| Hardinge Brothers, Inc. | 161 | Meyers Co., Inc., W. F. | 187 |
| Harris Foundry & Machine Co. | 295 | Michigan Chrome & Chemical Co. | 372 |
| Hartford Special Mchry. Co. | 305 | Michigan Drill Head Co. | 254 |
| Haskins Co., R. G. | 193 | Mid-West Abrasive Co. | 37 |
| Heald Machine Co. | 3 | Miller-Knuth Mfg. Co. | 306 |
| Heim Co. | 241 | Milwaukee Chaplet & Mfg. Co. | 359 |
| Heilmann Mfg. Co. | 264 | Minnesota Mining & Mfg. Co. | 233 |
| Highland Engr. Co. | 268 | Modern Machine Shop | 390, 391 |
| Hjorth Lathe & Tool Co. | 148 | Monarch Machine Tool Co. | 33 |
| Holo-Krome Screw Corp. | Fourth Cover | | |
| Humm Safety Equipment Co., John | 198 | Moore Industries, J. C. | 256 |
| Ideal Industries, Inc. | 397 | Moore Special Tool Co., Inc. | 205 |
| Independent Pneumatic Tool Co. | 395 | Motor Tool Mfg. Co. | 400 |
| Industrial Products Suppliers | 340 | | |
| Ingersoll-Rand Co. | 119 | Mummert-Dixon Co. | 212 |
| National Acme Co. | 257 | | |
| National Broach & Machine Co. | 277 | | |
| National Machine Tool Co. | 329 | | |
| Nebel Machine Tool Co. | 238 | | |
| New Method Steel Stamps, Inc. | 294 | | |
| Niagara Machine & Tool Works | 375 | | |
| Nichols & Sons, W. H. | 137 | | |

| | |
|--|-------------|
| Nichols-Morris Corp. | 137 |
| Nicholson & Co., W. H. | 353 |
| Nicholson File Co. | 145, 153 |
| Nielsen Tool & Die Co. | 338 |
| Noble & Westbrook Mfg. Co. | 296 |
| Norgren Co., C. A. | 109 |
| Norma-Hoffmann Bearings Corp. | First Cover |
| North Brothers, Div. of Stanley Works | 224 |
| Norton Co. | 202, 203 |
| Numberall Stamp & Tool Co. | 341 |
| O. K. Tool Co. | 52 |
| Oliver Instrument Co., Inc. | 71 |
| O'Neill-Irwin Mfg. Co. | 179 |
| Paramount Oilless Bearing Co., Inc. | 351 |
| Parker Co., Charles | 273 |
| Pittsburgh Stamp Co., Inc. | 308 |
| Porter-Cable Machine Co. | 371 |
| Pratt & Whitney, Div. Niles-Bement-Pond Co. | 99 |
| Precision Paper Tube Co. | 355 |
| Procunier Safety Chuck Co. | 116 |
| Production Machine Co. | 280 |
| Producto Machine Co. | 265 |
| Proffilm Corp. | 240 |
| Prosser & Son, Thomas | 201 |
| Racine Tool & Machine Co. | 95 |
| Raybestos-Manhattan, Inc., Manhattan Rubber Div. | 32 |
| Ramond & Associates | 387 |
| Reading Machine Co. | 296 |
| Reed Small Tool Works | 363 |
| Reid Bros. Co., Inc. | 60 |
| Reiff & Nestor Co. | 336 |
| Reitool Corp. | 361 |
| Rhodes Manufacturing Co. | 274 |
| Rivett Lathe & Grinder, Inc. | 107 |
| Robbins & Myers, Inc. | 177 |
| Roberts Rubber Co., Weldon | 44 |
| Rockford Clutch Div., Borg-Warner Corp. | 303 |
| Rockford Machine Tool Co. | 53 |
| Rogers Tool Corp., John M. | 346 |
| Ross Operating Valve Co. | 73 |
| Rotor Tool Co. | 47 |
| Runde Machine Tool & Die, R. W. | 332 |
| Rusnak Tool Works | 301 |
| Ruthman Mchry. Co. | 287 |
| S & S Machine Works | 172 |
| Sales Service Machine Tool Co. | 92 |
| Sanford Mfg. Co. | 324 |
| Savage Co., W. J. | 323 |
| Schauer Machine Co. | 46 |
| Scherr Co., Inc., George | 58 |
| Schmarje Tool & Engr. Co. | 326 |
| Schmidt, Inc., Geo. T. | 106, 310 |
| Schultes Tool & Engr. Co. | 356 |
| Schultz & Anderson Co. | 366 |
| Screw Machine Specialty Co. | 319 |
| Seneca Falls Machine Co. | 23 |
| Sentry Co. | 283 |
| Service Machine Co. | 252 |
| Services Directory | 388, 389 |
| Sheffield Corp. | 133 |
| Sheldon Machine Co., Inc. | 236 |
| Sibley Machine & Foundry Corp. | 85 |
| Simonds Saw & Steel Co. | 120 |
| Skilsaw, Inc. | 63 |
| Smith Boring Chuck Co. | 374 |
| Snap-On Tools Corp. | 229 |
| Sommer & Adams Co. | 4 |
| South Bend Lathe Works | 91 |
| Spartan Saw Works, Inc. | 206 |
| Springfield Machine Tool Co. | 96 |
| Stacklin Corp. | 186 |
| Standard Pressed Steel Co. | 247, 357 |
| Stanley Electrical Tool Div. | 191 |
| Staples Tool Co. | 39 |
| Star Gauge Co. | 155 |
| Stark Tool Co. | 293 |
| Starrett Co., L. S. | 45 |
| Sterling Factory Equipment Co. | 290 |
| Stevens Inc., John B. | 358 |
| Stow Mfg. Co., Inc. | 345 |
| Strand Mfg. Co. | 353 |
| Strong, Carlisle & Hammond Co. | 314 |
| Strutz & Mead, Inc. | 364 |
| Sturdimatic Tool Co. | 259 |
| Sun Oil Co. | 147 |
| Sonnen Products Co. | 219 |
| Super Tool Co. | 197 |
| Taft-Feirce Mfg. Co. | 68 |
| Tamm's Silica Co. | 332 |
| Tannewitz Works | 223 |
| Taylor & Fenn Co. | 228 |
| Taylor Machine Co. | 308 |
| Thriftmaster Products Div., Thomson Industries, Inc. | 317 |
| Timken Roller Bearing Co. | 1 |
| Tomkins-Johnson Co. | 94 |
| Topflight Tool Co. | 302 |
| Torit Mfg. Co. | 56 |
| Trindl Products, Ltd. | 331 |
| Troyke Mfg. Co. | 244 |
| Turner Mchry. Co. | 243 |
| Union Twist Drill Co. | 98 |
| Union Twist Drill Co., Butterfield Div. | 347 |
| Unique Mfg. Co. | 284 |
| United States Drill Head Co. | 288 |
| United States Electrical Tool Co. | 102 |
| V & O Press Co. | 378 |
| Van Keuren Co. | 113 |
| Vard, Inc. | 105 |
| Victor Mchry. Exchange, Inc. | 365, 367 |
| Vimeo Mfg. Co. | 266 |
| Vincent Steel Process Co. | 369 |
| Vinco Corp. | 27, 28, 29 |
| Wade Instrument Co. | 302 |
| Waldes-Koh-I-Noor, Inc. | 59 |
| Walker Co., Inc., O. S. | 183 |
| Walker-Turner Co., Inc. | 57 |
| Wall-Colmonoy Corp. | 136 |
| Walls Sales Corp. | 358 |
| Waltham Machine Works | 304 |
| Walton Co. | 351 |
| War Assets Corp. | 377, 379 |
| Wardwell Mfg. Co. | 232 |
| Warner & Swasey Co. | 18, 19 |
| Warren City Mfg. Co. | 65 |
| Watts Bros. Tool Works | 276 |
| Weber Machine Corp. | 343 |
| Weldon Tool Co. | 215 |
| Westcott Chuck Co. | 89 |
| Western Tool & Mfg. Co. | 339 |
| White & Bagley Co. | 108 |
| Whitney Metal Tool Co. | 357 |
| Wickman Corp. | 231 |
| Wiedemann Machine Co. | 78 |
| Williams & Co., J. H. | 237 |
| Wilson, K. R. | 43 |
| Wilson Mechanical Instrument Co. | 88 |
| Wirth & Son, Carl | 359 |
| Wisconsin Drill Head Co. | 364 |
| Wood & Spencer Co. | 309 |
| Woods Engr. Co. | 382 |
| Woodworth Co., N. A. | 169 |
| Yoder Co. | 30, 31 |
| Yohe Supply Co., Wm. S. | 272 |
| Young Arbor Co. | 360 |
| Zeiss, Inc., Carl | 282 |
| Ziegler Tool Co., W. M. | 368 |

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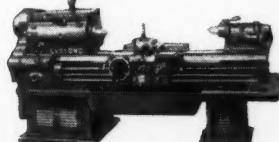


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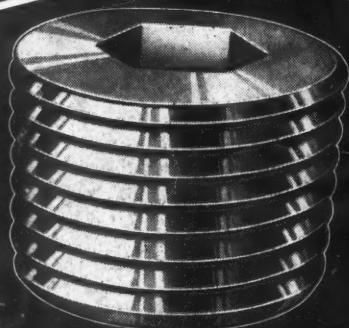
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